"**MANY STEEL USERS** have completed their inventory adjustments," believes George L. Stewart, president, Jones & Laughlin Steel Co.'s Warehouse Div. Like other Chicago-Midwest metalworkers visited by STEEL's air safari editors checking today's business pulse, he expects further improvement in coming months. This area's executives are among the nation's most optimistic. You'll see why on Page 51

STEEL

The

Metalworking Weekly

MAY 16, 1960

A PENTON PUBLICATION

Steel Service Centers Plan More Aggressive Marketing

AC Spark Plug's Team Concept Unravels the Production Snarls

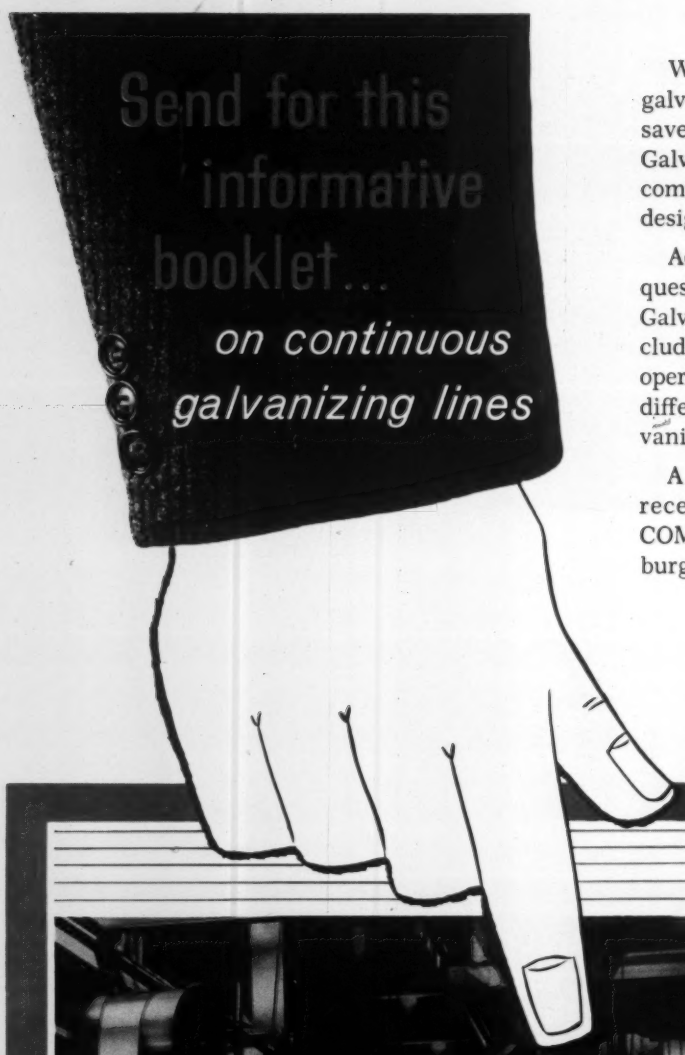
Canmaker Gets Set to Test Automatic Sheet Sorting, Stacking

PRODUCTION EFFICIENCY

How to Engineer for It

No. 10 in STEEL's Program for Management

CONTENTS—TURN PAGE



What makes the difference between one galvanizing line and another? How can you save money on the purchase of a Continuous Galvanizing Line? What are the different components that must be considered in the designing of a line?

Aetna-Standard answers these and other questions in this new booklet on Continuous Galvanizing Lines. Other information includes information on the number of lines operating in the world; and pictures of different components of Continuous Galvanizing Lines.

A copy will be mailed promptly upon receipt of your request. BLAW-KNOX COMPANY, Aetna-Standard Division, Pittsburgh, Pennsylvania.

BLAW-KNOX

Aetna-Standard Division
BLAW-KNOX

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THE
WORLD'S
LEADING
DESIGNER
AND BUILDER
OF CONTINUOUS
GALVANIZING
LINES

Aetna-Standard Division
BLAW-KNOX

This Week in STEEL

The Metalworking Weekly

May 16, 1960 Vol. 146 No. 20

AC Spark Plug's Team Concept Unravels Snarls

General Motors Corp.'s new concept, the Production Engineering Team Approach, is aimed at simplifying the co-ordination of multiple manufacturing jobs. When AC Spark Plug developed its electronic ACilloscope, for observing spark plug performance, its team whipped up a production plan in 12 days. Here's how the system works. PAGE 54

Steel Service Centers Plan Aggressive Marketing

They're no longer just metals warehouses but service facilities in the truest sense. Modern service centers are marketing fabricating and processing services as well as materials. Here's how the centers are adapting to the changing pattern of steel consumption. PAGE 56

Production Efficiency: How to Engineer for It

You can engineer for production efficiency by finding the right answers to these questions:

1. How do you minimize engineering costs without sacrificing quality?
2. How do you get maximum quality for what you pay?
3. How and when do you pay?
4. Should builders charge for all proposals?

For the answers, STEEL went to industry authorities like General Electric Co.'s William W. Kuyper, at right. Here are the answers, from buyers and builders alike. PAGE 61

Transfer Machine Uses Building Block Setup

A conveyor linked system of 32 machining stations forms one multipurpose transfer machine at George Gorton Machine Tool Co., Racine, Wis. Separate stations in its building block construction can be used as single units. The versatile setup is like having 32 machines and operators on a conveyor line. Standard components minimize design and building costs. Heads are positioned to use standard cutters, which are inspected automatically by electric eye. PAGE 98

Canmaker Tries Automatic Sheet Sorting, Stacking

A sorting machine developed by an English fabricator will separate prime sheets from rejects automatically and neatly stack both on pallets ready for processing. Makers of the machine expect it to be used in electrolytic tinning lines or in processes where aluminum sheets are handled.

PAGE 106

J&L to Let Distributors Sell All Stainless

Watch for fresh emphasis on stainless steel marketing as a result of Jones & Laughlin Steel Corp.'s move to channel all stainless sales through steel service centers. With distributors moving a growing share of the industry's stainless products, J&L will pitch in to help their distributors' marketing programs. Other producers are expected to step up sales efforts to meet the challenge. PAGE 135

COMPLETE CONTENTS ▶

CONTENTS

Metalworking Week, Page 41

The Editor's Views—Your Stake in Defense 47
Midwest Pushes for Record Sales—Optimism high throughout area 51
No. 3 in STEEL's coast-to-coast air safari series
How AC Spark Plug Goes About Unraveling Production Snarls .. 54
Distributors Step Up Modernization—Outline 1960 objectives 56
Production Efficiency—How to Engineer for It 61
No. 10 in STEEL's Program for Management for 1960
Armco Steel Modernizing Hamilton, Ohio, Plant 81

Technical Outlook, Page 95

Tankmaker Builds on Foundation of Product Reliability 96
Transfer Machine Uses Building Block Setup 98
Automated Slitting, Welding Improve Industrial Grating 100
Annealing Setup Tames Silicon Steel—Furnace has four zones 102
Glutinous Plastic Applied as Core for Curtain Walls 104
Sheets Graded, Stacked Automatically—Machine developed abroad 106
Automatic Chucking Lathes Speed Short Run Jobs 108
Progress in Steelmaking—Sinter Plant Is Co-ordinated from Master Controlroom—Intercom aids in changing material, air, gas flow 110
Rolling Boosts Spline Production—Evinrude cold forms them 114
Polystyrene Pattern Simplifies Casting—Engineering, art combined 115

Market Outlook, Page 133

Complete Index to Market News and Prices 133
J&L to Let Distributors Sell All Stainless—Interest runs high 135
Steel Shipment Records Fall in First Quarter 141
Steelworks Operation Chart and District Ingot Rates 142
Exports Lend Support to Scrap—Index is unchanged 154
Steel Markets Under Less Pressure from Imports 155
Nonferrous Metals—Lots of Smoke; No Fire 158

WHERE TO FIND

Servicenter	5	The Business Trend	71
Calendar of Meetings	10	Men of Industry	75
Editorial & Business Staffs	16	Obituaries	78
Metalworking Pulse	43	New Products	117
Windows of Washington ..	58	New Literature	131
Mirrors of Motordom	67	Advertising Index	163

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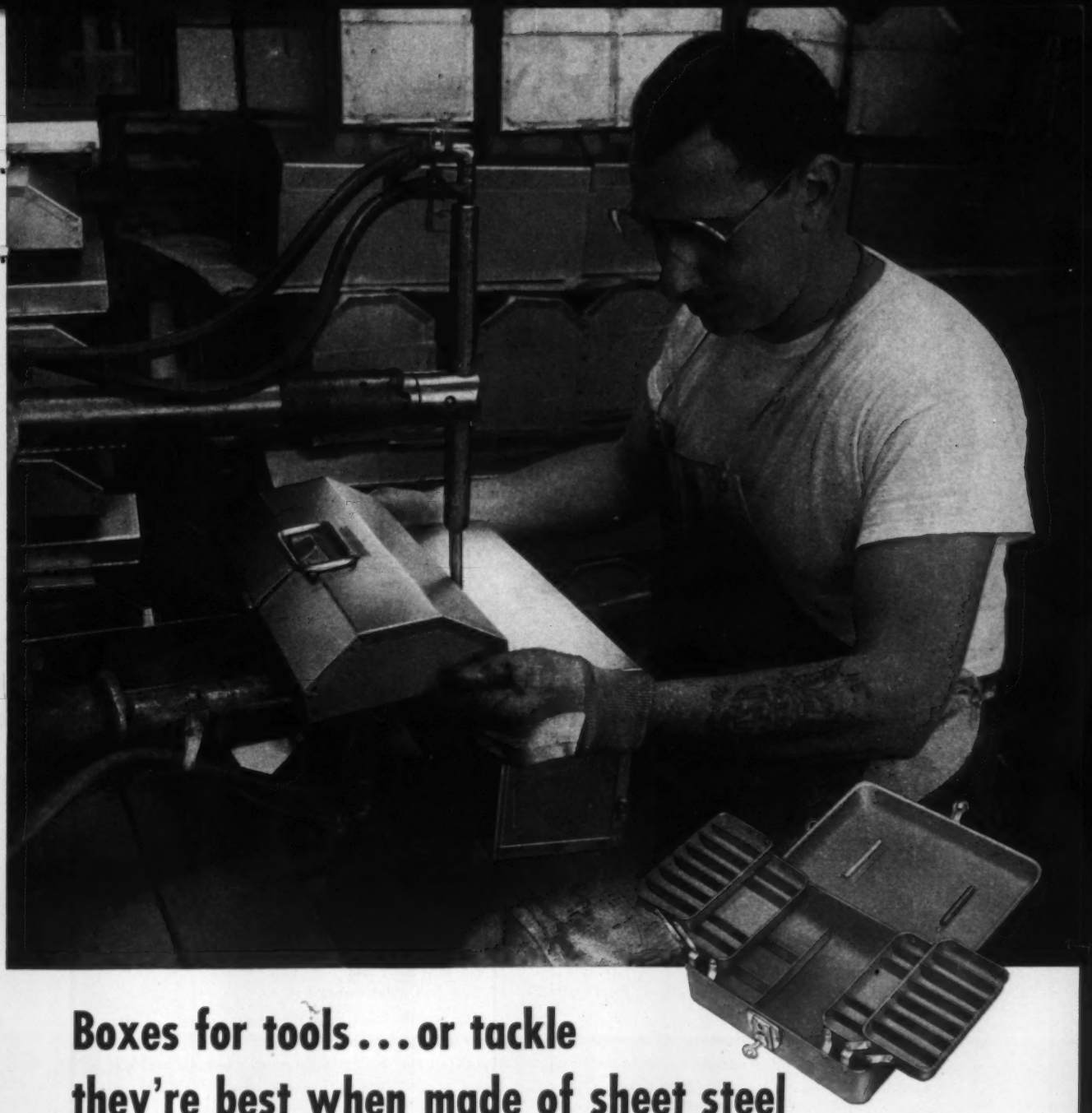


Boxes for tools . . . or tackle they're best when made of sheet steel

Strong, durable, easy to work, light in weight, low in cost—all these factors point to sheet steel as the ideal material for tackle and tool boxes. Whether you make or use such boxes, you can be sure they're best if they're made of sheet steel.

Bethlehem sheets—cold-rolled as well as Bethcon continuously galvanized—are used in the manufacture of thousands and thousands of utility boxes. Other Bethlehem sheets go into automobile stampings, agricultural machinery, grain storage bins, metal furniture, tubing and, yes, baby carriages! We'll be glad to discuss your requirements.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

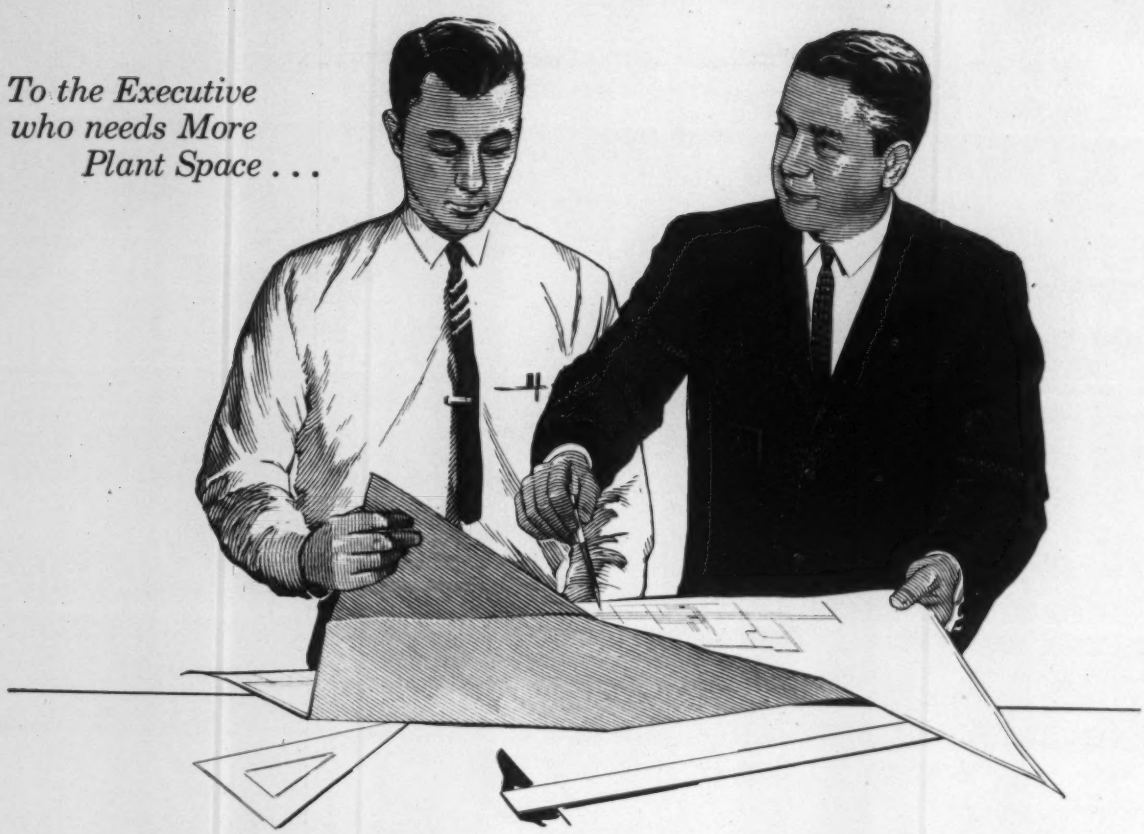
Export Distributor: Bethlehem Steel Export Corporation

Steel for Strength . . . Economy . . . Eye-Appeal

BETHLEHEM STEEL

BETHLEHEM STEEL

To the Executive who needs More Plant Space . . .



Why not simplify your present operations by using Clad-Rex® vinyl-clad metals?

Why not, indeed! Your investment in equipment, space and labor for finishing operations might be much more profitable in other activities. And what about the time and cost to strip and rework the rejects common to assemblies finished with relatively delicate coatings . . . ?

Clad-Rex vinyl-clad metals can be moved directly from forming to assembly, because they're already finished. This also eliminates a lot of costly metal treating and handling. The abrasion resistance of Clad-Rex sharply reduces rejects. As a matter of fact, the vinyl surface is so practical, Clad-Rex vinyl-clad metals can be worked much the same as bare metal. No special tooling or involved technique is needed.

These factors can lower your end product cost even though Clad-Rex vinyl-clad metals cost more to buy than *un*finished metals. Furthermore, you add sales appeal, because Clad-Rex styling is almost unlimited.

It's worth looking into—particularly when you realize your existing tooling (including forming dies) can be used in most cases. Clad-Rex has a Field Fabricating Engineer available to show your production people how easy it is to get into production.

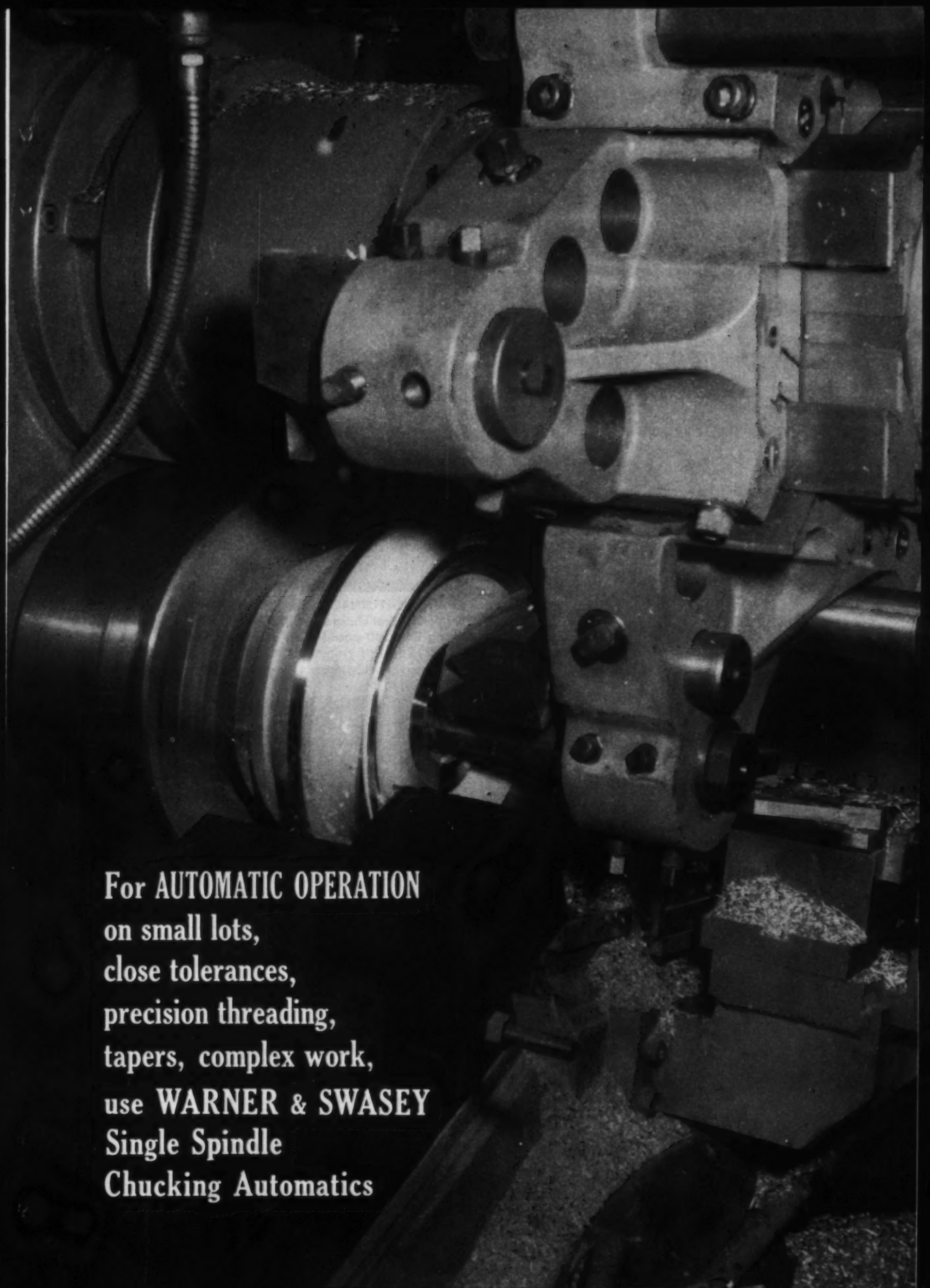
See for yourself. Write and ask for details on Clad-Rex vinyl-clad metals. No obligation, of course.

VINYL-METAL LAMINATES BY **CLAD-REX**® DIVISION OF SIMONIZ COMPANY

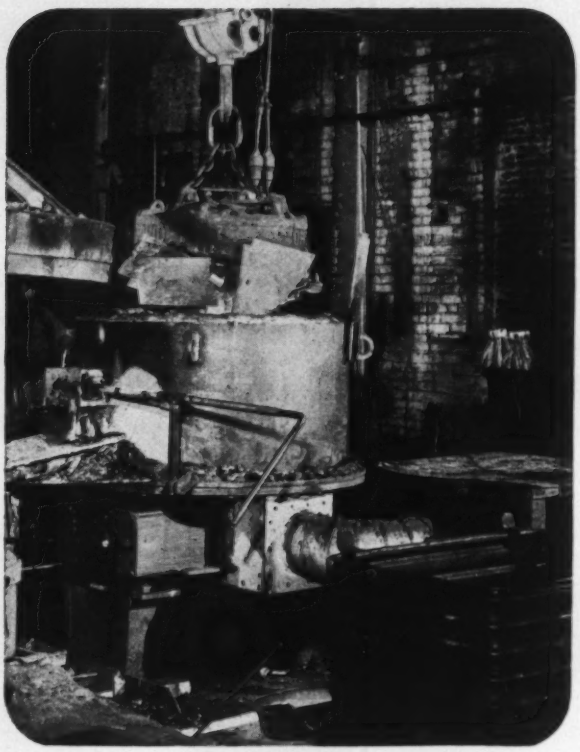
2105 Indiana Avenue • Chicago 16, Illinois

Telephone: VIctory 2-7272

12A


For AUTOMATIC OPERATION
on small lots,
close tolerances,
precision threading,
tapers, complex work,
use WARNER & SWASEY
Single Spindle
Chucking Automatics

5 ways to make your foundry more efficient with OHIO MAGNETS

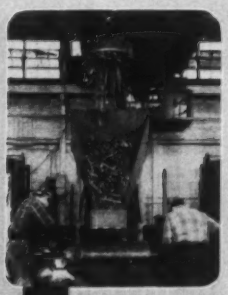


1 CHARGING FURNACE. One 36-inch Ohio Bolted Magnet charges six 375 KW furnaces giving 240 500-pound heats each 24 hours.

2 SCRAP HANDLING. All scrap is handled efficiently, economically with Ohio Magnet. Single 36-inch magnet replaces grapple, clamshell, bucket or lift truck.

3 SORTING. Castings are conveyed from Wheelabrator to hard-iron inspection. Ohio Magnet picks parts out of sorting bins.

4 UNLOADING ANNEALING FURNACE now takes one man 10 to 20 minutes with Ohio Magnet. Lift truck used to take 1 to 2 hours.



5 LOADING GRINDING HOPPER after conveying parts from inspection department. Same Ohio Magnet is used for operations shown in photos 3, 4 and 5.

Photos: Courtesy I-F Manufacturing Company, New Philadelphia, Ohio

ohio ELECTRIC

Small foundry or large, magnetic materials handling points the way to higher productivity, higher efficiency. And with Ohio Magnets on the job you get high availability, too. That's because Ohio Magnets are built with that extra margin of safety that means long, service-free life. Yes, *magnetic materials handling pays—especially with Ohio Magnets.*

THE OHIO ELECTRIC MFG. CO.

5400 Dunham Road • Maple Heights • Ohio

Subsidiary of Howell Electric Motors Company

Falcon

Station Wagon

Thunderbird

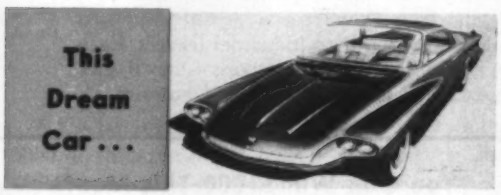
Galaxie

A Chance to Beat the Experts

Do you have a yen to drive a Thunderbird or a Falcon? You might gratify the urge if you take a fling at STEEL's Beat-the-Experts contest. Just follow this word map to the South and get the route.

All you do is estimate the number of passenger cars that will be produced in the U. S. from Jan. 1 through Dec. 31, 1960. The winners will be the six readers who come closest to the production figure.

The best guesser will select any of the 21 cars built by Ford Div., Ford Motor Co., to use as his own for 14 days. He will have 60 days after contest results are published to pick up and use a car—any model from the Falcon through the Thunderbird. It will be available at the Ford outlet nearest his home.



. . . was rendered in full color for STEEL's contest by Virgil M. Exner, vice president and director of styling, Chrysler Corp. Five runners up will win color prints of his creation.

Anyone, except employees of The Penton Publishing Co., may enter. You'll find an entry blank in this column every week until the contest closes. Facsimiles are acceptable, but only one entry per man is permitted.

Preliminary production figures released by *Ward's Automotive Reports* will be the final authority. They're announced in January, 1961, so you can learn the contest results in this column around that time. A clue: Competition is pretty stiff, so use a seven digit figure—6,456,789, for example.

Entries must be postmarked before midnight, June 30, 1960. In case of ties, the earliest postmark will determine the winner. Better clip the coupon, complete it, and post it today.

How Big is a Giga?

If you were to measure the diameter of a gnat's whisker, you'd probably express your findings in a nano or pico. Here's why. The National Bureau of Standards is using the International Committee on Weights and Measures' new prefixes for denoting multiples and submultiples of units.

Multiples and Submultiples	Prefixes	Symbols
1 000 000 000 000 = 10^{12}	tera	T
1 000 000 000 = 10^{9}	giga	G
1 000 000 = 10^{6}	mega	M
1 000 = 10^{3}	kilo	k
100 = 10^{2}	hecto	h
10 = 10	deka	dk
0.1 = 10^{-1}	deci	d
0.01 = 10^{-2}	centi	c
0.001 = 10^{-3}	milli	m
0.000 001 = 10^{-6}	micro	μ
0.000 000 001 = 10^{-9}	nano	n
0.000 000 000 001 = 10^{-12}	pico	p

The Bosses Write

"I would like to obtain ten reprints of 'Boost the Boss's Productivity Too,' from the Mar. 28 issue," writes W. P. Juckem, vice president-manufacturing, Eagle Signal Co., Moline, Ill. "I was most impressed and would like to circulate it among my subordinates."

The sentiment is echoed by B. D. Maddox, vice president and general manager, Gardner-Denver Co., Grand Haven, Mich. He says: "Please send me six copies . . . to use for discussion with our managers."

Says Robert L. Zurbach, vice president, Drake Steel Supply Co., Los Angeles: "An excellent

I believe _____ automobiles will be produced in the U. S. from Jan. 1 through Dec. 31, 1960.

Mail this to:
Ed Service
Beat the Experts
STEEL
Penton Bldg.
Cleveland 13, Ohio

PRINT NAME _____
POSITION _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____

Entries must be postmarked before midnight, June 30.

"the HITCHINER way..."

saves 35 MACHINING OPERATIONS with INVESTMENT CASTING

This barrel of a .22 caliber target revolver is now being cast by Hitchiner's new ceramic shell process. This new investment casting technique provides sufficient close tolerances and finishes to eliminate the need for 35 machining operations. Gun barrel tolerance of 0.006 inch was normal, but plus over minus 0.001 inch was maintained on certain areas. Only external finishing needed was partial polishing.

These savings have allowed the manufacturer of this revolver to sell it for considerably less than a similar previous model.

Through investment casting, parts can be designed for function and maximum operating efficiency with the widest selection of alloys from which to choose. This freedom from manufacturing problems can result in more flexibility in design and less waste in production.

Send us a sample or blueprint and check your specific problem with our "engineered quotation" — no obligation, of course.

Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure explaining investment castings.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 35, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

article. This issue was specifically circulated to all top management in our company."

Changes in the Masthead . . .

. . . were O.K.'d earlier this month to meet the requirements of STEEL's future growth. Dave Kiefer, formerly STEEL's business manager, was elected vice president-marketing of The Penton Publishing Co. New in the business manager role is Sal Marino, who moved up from his position as promotion director. In the new lineup, Sal also functions as co-publisher of STEEL, sharing those responsibilities with Editor Walt Campbell. Chuck Tallinger was advanced to advertising director.

Decisions . . . Decisions

After News Editor Bill Dean (left) and Associate Editor George Howick (right) finished one of the swings in STEEL's coast-to-coast air safari, they huddled to choose the best photos for publication. Personalities entered the selection. Seems many of the on-the-spot pictures were taken by secretaries and airline stewardesses and editors have a penchant for scoring points with them. They claim it eases travel. Anyhow, the discussion was resolved with quality guiding the selection.

In this issue, you can read about STEEL's check on the beat of the business pulse in the Midwest. In following weeks, you'll see viewpoints expressed by Western and Southern industrial leaders. Keep an eye peeled for the field reports—they'll give you an excellent look at the state of business.

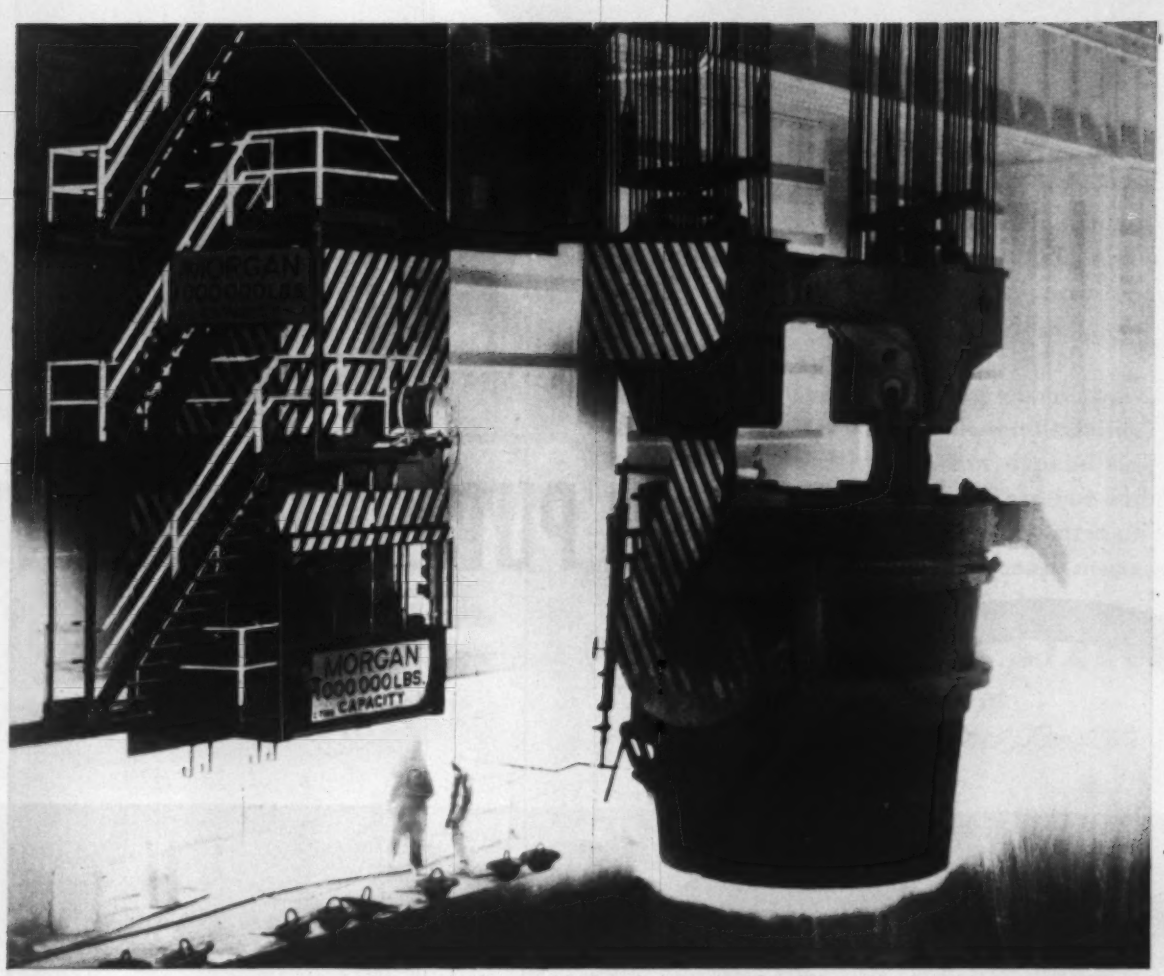
You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—May, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If in the opinion of the judges, yours is the best idea submitted—you will win $500.

There's more . . . You will win an additional $500 if you furnish written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

You can enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Deadline for this month's contest is July 1, 1960.



Repeated million-pound loads in the intense heat from 375 tons of molten steel, cause no spalling or deformation of Rollway Bearings.

1,122,000 Pounds Ride on 68 Rollway Bearings

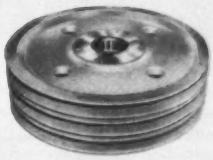
One of the largest in the world, this 500-ton Morgan-built ladle crane is Rollway equipped in many positions.

Sixty-eight maximum-type, solid-cylindrical bearings—mounted without inner races—lift and lower the 1,122,000-pound weight of the lifting beam, ladle hooks, ladle and white-hot steel.

Rollway Tru-Rol® type bearings are used in the two General Electric 360 HP – MD-620 Hoist motors which lift the weight of the ladle and its molten metal content.

The maximum-type bearings in the hoisting sheaves are mounted directly on the shaft without inner races, which greatly simplifies assembly for applications of this size.

Thrust bearings in the 25-ton and 75-ton auxiliary crane hooks are standard Rollway precision types with broad-area contact between rollers and plates to prevent Brinelling and assure freedom of rotation under the heaviest loads.



Sheaves ready for assembly on shaft and installation in lifting beam.

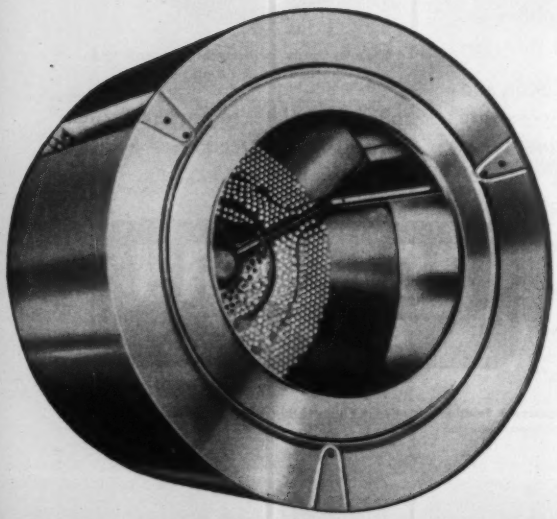
For bearings that accomplish the extraordinary in an ordinary manner, write, wire or 'phone Rollway Bearing Co., Syracuse 1, N.Y.

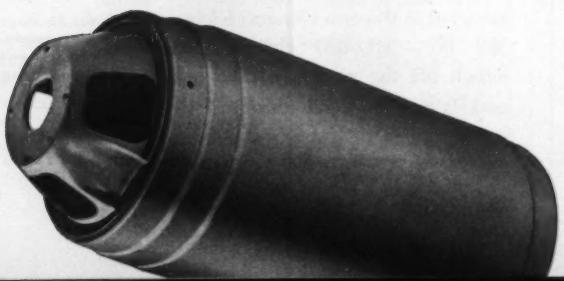
ROLLWAY® BEARINGS

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

REPUBLIC PUTS THE "ABILITY"

EXCELLENT PAINT-GRIPPING surface characteristics and corrosion-resistance of *Republic Electro Paintlok®* are not affected by forming operations. Produced by electro-galvanizing, plus a chemical treatment, Electro Paintlok not only holds paints, lacquers, and enamels better, but has an exceptionally smooth surface that results in finished, painted products with more eye appeal. Mail coupon for more information.





IN FORM-ABILITY

Sheet steel for the "shapes of the sixties." Steels with greater formability—to take sharp, acute angles, and never crack or flake—to withstand deep drawing operations, and hold their strength and performance properties—to cut clean, be punched and perforated—to retain their corrosion-resistance—to undergo extensive fabricating, and come up shining-bright.

Steels to meet all your fabricating requirements. Formability that gives you new design flexibility. Uniformity and quality you can depend on. Republic Sheet Products. Included are hot and cold rolled carbon, alloy, stainless, high-strength and titanium. Also a full line of coated sheets.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

DEEP DRAWING of *Republic* ENDURO® *Stainless* illustrates the exceptional formability of versatile ENDURO. Highest uniformity and quality of Republic Stainless assure satisfactory performance with all types of fabricating techniques—blanking, shearing, punching, drawing, spinning, shrink and stretch forming. ENDURO is offered in many types and finishes to meet your exact requirements. For more data, mail coupon.

SHARP BENDS, FLANGING, seaming—ductile zinc coating on *Republic Galvannealed Sheets* stays tight, resists flaking, peeling, or spalling. Hot dip galvanizing plus special heat treatment give Galvannealed a graduated coating of iron-zinc alloys between the pure zinc outer surface and the base metal. The tough, uniform protective finish is spangle-free, provides a good paint base, withstands temperatures up to 750°. Send coupon.

MASS PRODUCTION FORMING processes do not damage the uniform, tight zinc coating of *Republic Continuous Galvanized Sheets.* This product is ideal for applications where corrosion-resistance and low initial cost are considerations. Zinc coating won't crack, flake, or peel under any forming process permitted by the base metal. Costly dipping after fabrication is eliminated. To get more information, send coupon.

USE THESE STEELMARKS of the American Steel Industry to identify products you make of steel, stainless steel, or galvanized steel. STEELMARK stickers and tags are available in any quantity you need. Mail coupon for complete, information on ordering.

REPUBLIC STEEL CORPORATION
DEPT. ST-9374-A
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send additional information on the following:

- ☐ Galvannealed Sheets
- ☐ Electro Paintlok Sheets
- ☐ Republic ENDURO Stainless Steel Sheets
- ☐ Continuous Galvanized Sheets
- ☐ American Steel Industry STEELMARKS

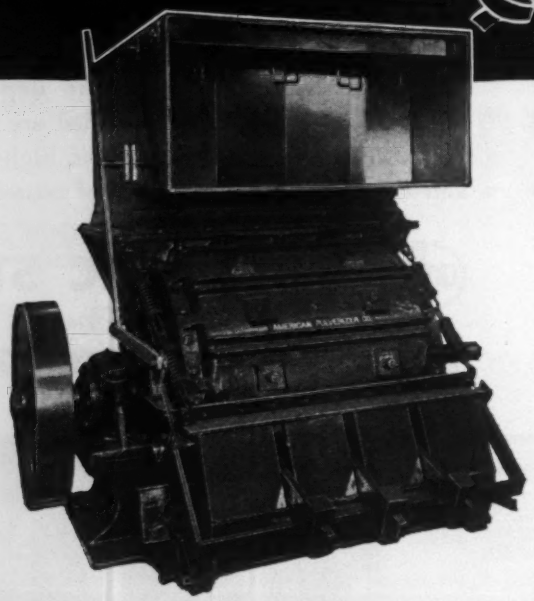
Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

Here's A Curly Cue To New Market Value For Your Machine Turnings



American METAL TURNINGS Crusher

That single machine turning of curled-up steel shown above can be mighty troublesome and costly to your operations.

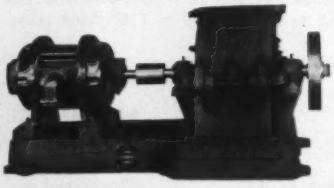
Gnarled up with thousands of others like itself, it becomes a problem in space . . . gallons of re-usable cutting oil are trapped in the folds . . . and the scrap value is greatly minimized.

Answer? Run this tangled waste through an efficient, AMERICAN METAL TURNINGS CRUSHER. Out come sized ships that are easy to handle for shoveling or pneumatic handling . . . easy to store (savings in space up to 75%) . . . easy to spin for oil recovery . . . and crushed turnings command a higher price.

The cost is easy, too, on your scrap recovery program. Pays for itself.

RECLAIM FUSED WELDING FLUX

American Hammermill reduces fused flux to fine regranulation for perfect re-use. Why throw away profits! Details on request.



"Write for Metal Turnings Bulletin"

American PULVERIZER COMPANY

Designers and Manufacturers of Ring Crushers and Pulverizers

1539 MACKLIND AVE. • ST. LOUIS 10, MO.

CALENDAR OF MEETINGS

May 17-19, American Society of Mechanical Engineers: Production engineering conference, Schroeder Hotel, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

May 18-20, American Management Association: General management conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

May 18-20, Electronic Industries Association: Annual meeting, Pick-Congress Hotel, Chicago. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Executive vice president: James D. Secrest.

May 18-20, Society for Experimental Stress Analysts: Spring meeting, Severin Hotel, Indianapolis. Society's address: P. O. Box 168, Cambridge 39, Mass. Secretary-treasurer; W. M. Murray.

May 19-20, National Industrial Conference Board Inc.: General session for all associates on economics and annual meeting of board members, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

May 22-25, Industrial Heating Equipment Association: Spring meeting, Homestead Hotel, Hot Springs, Va. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Robert E. Fleming.

May 22-25, National Association of Purchasing Agents: Annual meeting and exhibit, Biltmore Hotel, Los Angeles. Association's address: 11 Park Place, New York 7, N. Y. Executive secretary: G. W. H. Ahl.

May 22-26, Air Pollution Control Association: Annual meeting, Netherland-Hilton Hotel, Cincinnati. Association's address: 4400 Fifth Ave., Pittsburgh 13, Pa. Executive secretary: Harry M. Pier.

May 22-26, American Society of Mechanical Engineers: Oil and gas power conference and exhibit, Muehlebach Hotel, Kansas City, Mo. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Shier.

May 23-25, Triple Industrial Supply Convention: Conrad Hilton Hotel, Chicago. Information: W. B. Thomas, Thomas Associates, Keith Bldg., Cleveland 15, Ohio.

May 23-26, American Society of Mechanical Engineers: Design engineering conference and show, Statler-Hilton Hotel, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Shier.

NICKELOID
HELPS MAKE A MAN'S WORLD

Fish lure, made of Nickel Brass.

Putting disc (Chrome Steel) and waste basket.

Ice bucket, tongs, tray, and bottle holder—all made of Nickeloid Metals.

Hair brush, made of Red Goldbond Steel.

Torpedo Level. The metal is Nickel Zinc.

Desk accessories, all made of Nickeloid Metals.

Whenever a man is at work, at home, or at play—his world is brightened by the utility and functional features of Nickeloid pre-plated metals. These durable, brilliant, and economical metals have been designed into so many articles for men because of their triple advantages: appearance plus basic production economy plus a finish that can "take it" as few other finishes can. Look about you . . . your desk, your home, your recreation room . . . note the many parts made of bright metals. Many of these, whether Chromium, Nickel, Brass or Copper, are quite likely to be fabricated from a Nickeloid Metal. Nickeloid Metals are available in sheets, coils, and strips—bright or satin—and in a beautiful range of stripes, patterns, crimps and textures. Write us for free Introductory Kit, which gives full information.

Visit the Nickeloid Booth #2418
1960 Design Show. N. Y. Coliseum
May 23-26

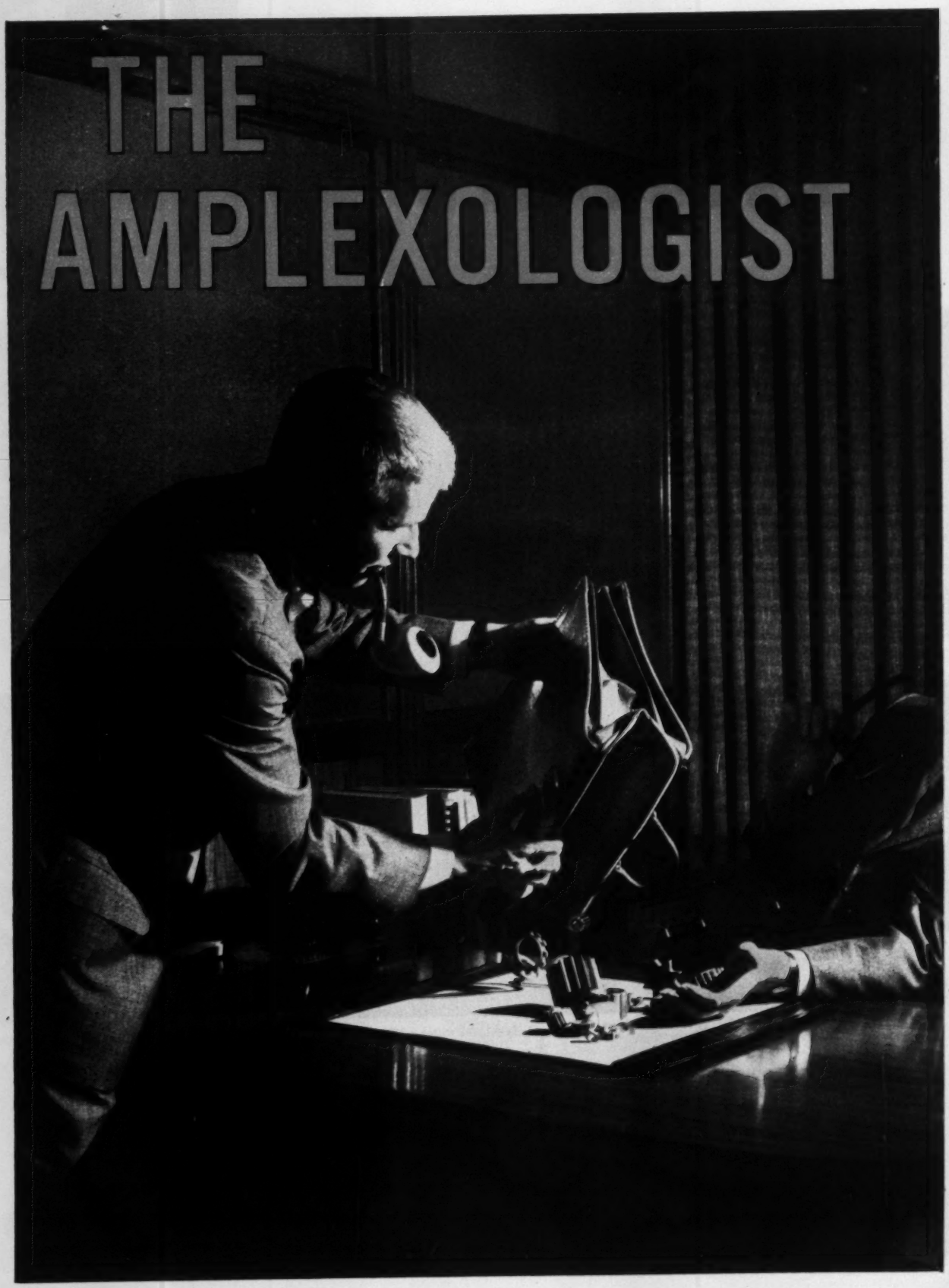
Sales offices in principal cities

NICKELOID METALS SINCE 1890 NM

AMERICAN NICKELOID COMPANY, PERU 1, ILLINOIS

PLANTS: PERU, ILL. AND WALNUTPORT, PA.

THE AMPLEXOLOGIST

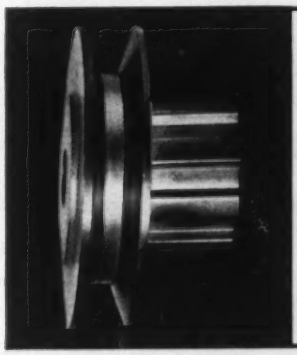


The Amplexologist is not adverse, at times, to using a little hard sell. Especially when he's talking to a hard-headed prospect. Like the manufacturer whose ideas about powder metallurgy seem to be based on information he picked up second hand in, maybe, 1935. The Amplexologist, you see, resents being told—*"It won't work, it can't be done"*—when he's doing it.

Ergo: Dump a few hard facts in the man's lap.

For example: pulleys, sprockets, cams, gears . . . in dozens of combinations of sizes and shapes. Parts that "couldn't be made" out of powder metal. Parts that Amplex—with new techniques, new alloys, advanced density control—*is* making today. Take a look!

Well, credit where credit is due. Most manufacturers, we're happy to say, are ready to revise their ideas after the Amplexologist submits the facts. Their openmindedness has saved them thousands of dollars. They like that. We like it, too. It has helped make us the world's largest and most experienced producer of powder metal parts. It's one reason so many manufacturers say: **When it comes to powder metallurgy—Amplex has the answer.**



LIKE TO LOOK AT A FEW HARD FACTS YOURSELF?

The part shown is a pulley. Amplex makes it in one piece. A precision part that requires no machining—not even of the V groove. This is one example. The Amplexologist will be happy to load his brief case, come to your office and show you many more. Could open your eyes to the possibilities of advanced powder metallurgy (i.e. Amplexology). Might save you some money, too.

AMPLEXOLOGIST

SEND COUPON . . . if you'd like to talk over your product with the Amplexologist. Don't hesitate. He's always happy to get out of the office.

AMPLEX DIVISION • CHRYSLER CORP. • Dept. S5
P.O. Box 2718 • DETROIT 31, MICH.

Please have the Amplexologist call to look into the possibility of using powder metal parts in our product.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

PRODUCT_____

AMPLEX

DIVISION
CHRYSLER
CORP.

A CHRYSLER OILITE PRODUCT

IT PAYS TO STANDARDIZE ON **STANSCREW**

Stanscrew fasteners add to reliability of SPEED QUEEN appliances

Speed Queen laundry appliances are built to take a beating. In these automatic washers and dryers, components are necessarily subjected to vibration, heat, moisture, and customer abuse . . . must withstand punishment year after year if Speed Queen's outstanding reputation for quality is to be upheld.

For example, consider the socket set screw being inserted on the motor pulley above. Should this loosen, the customer would have to pay for a service call . . . and Speed Queen would have to pay in consumer dissatisfaction. Therefore, to maintain rigid quality standards, Speed Queen has chosen Stanscrew fasteners for this and other demanding applications.

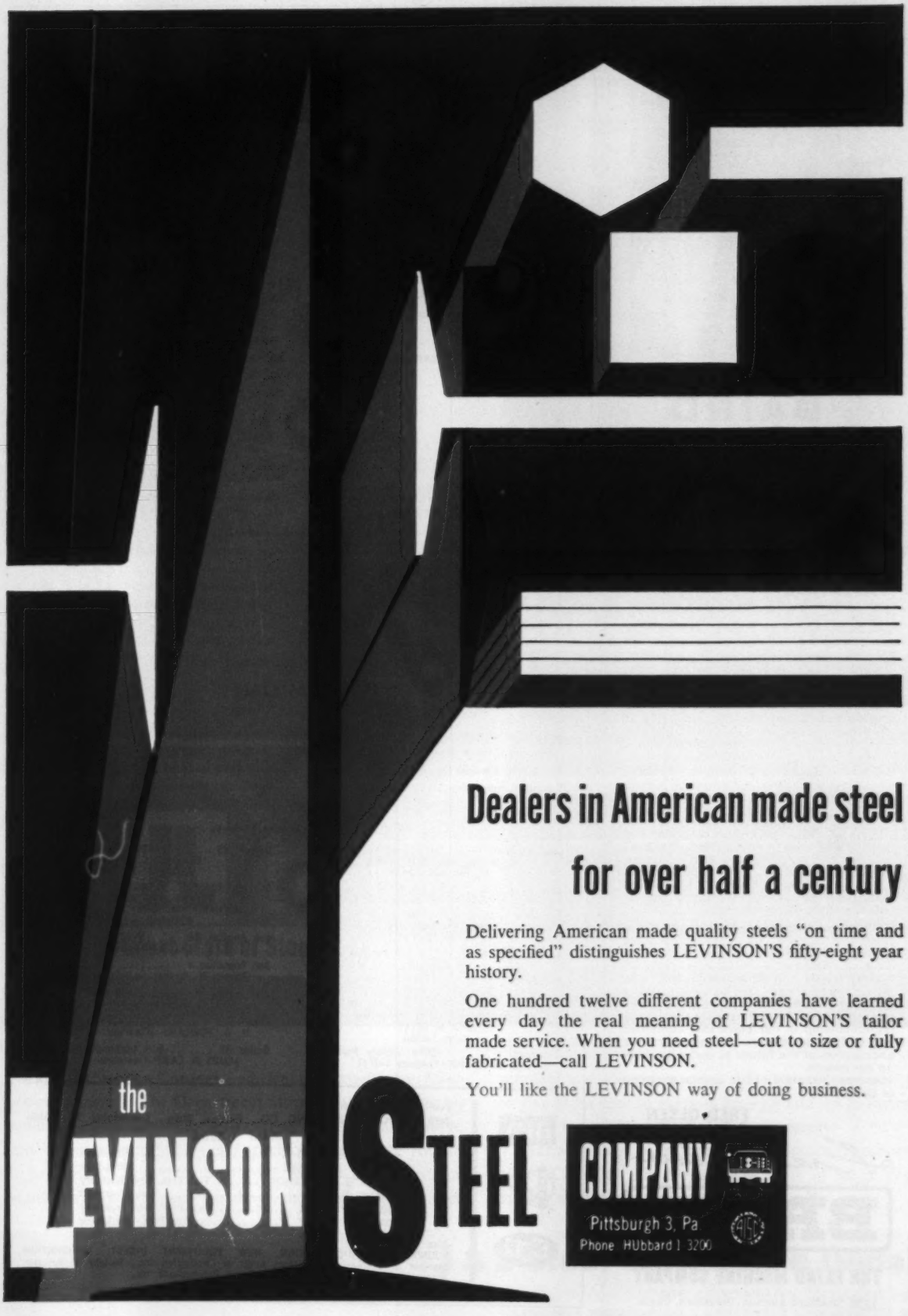
Despite their high standards of quality, Stanscrew fasteners are economically priced. And they are offered in a comprehensive selection of over 5,500 different types and sizes to meet the overwhelming majority of all fastener requirements. All 5,500 are quickly available through your local Stanscrew distributor.

Call your Stanscrew distributor today. He will arrange a visit from a Stanscrew fastener specialist who can often suggest ways to cut assembly or fastener costs . . . for example by substituting an inexpensive standard fastener for a costly special.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

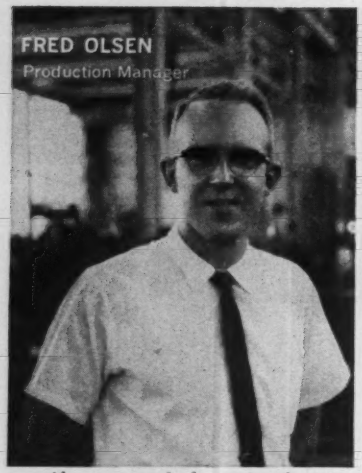


Dealers in American made steel for over half a century

Delivering American made quality steels "on time and as specified" distinguishes LEVINSON'S fifty-eight year history.

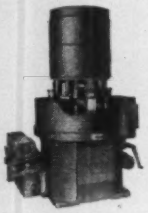
One hundred twelve different companies have learned every day the real meaning of LEVINSON'S tailor made service. When you need steel—cut to size or fully fabricated—call LEVINSON.

You'll like the LEVINSON way of doing business.



the special meaning

of **BAIRD**

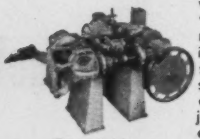


Vertical Continuous Lathe

It didn't take us long to learn that one of the secrets of success in the production end of the automatic machinery building business was simply following our own advice.

Since 1846, sales representatives of the Baird Machine Company have been calling on their customers and prospects preaching the gospel of cost reduction, quality control and improvement through modern, up-to-date machinery. The impossibility of achieving precision, accuracy and constant, trouble-free output of production parts on obsolescent equipment became quite apparent.

With us, here at Baird, it became "preaching" which we ourselves "practiced". Most machines we have in our shop represent what we consider to be the best equipment for the job. New machinery acquisitions and improvements undergo constant evaluation. Result, manufacturing standards for which Baird is famous.



Four-Slide

Machines, of course, are only part of the story. Our "people" facilities list is equally impressive. Grandsons of men who worked on Baird Chuckers, Transfer Presses, Four-Slides, Barrel Finishing equipment and Bench Presses work with us now, taking a family pride in the machines their company produces. There is an atmosphere of Yankee craftsmanship in our plant that combines with 114 years of experience and an anxious anticipation of the future to make its mark on our people.

Another example of the special meaning of Baird.

FRED OLSEN

Fred Olsen

BAIRD

THE BAIRD MACHINE COMPANY

1300 Stratford Avenue, Stratford, Conn.

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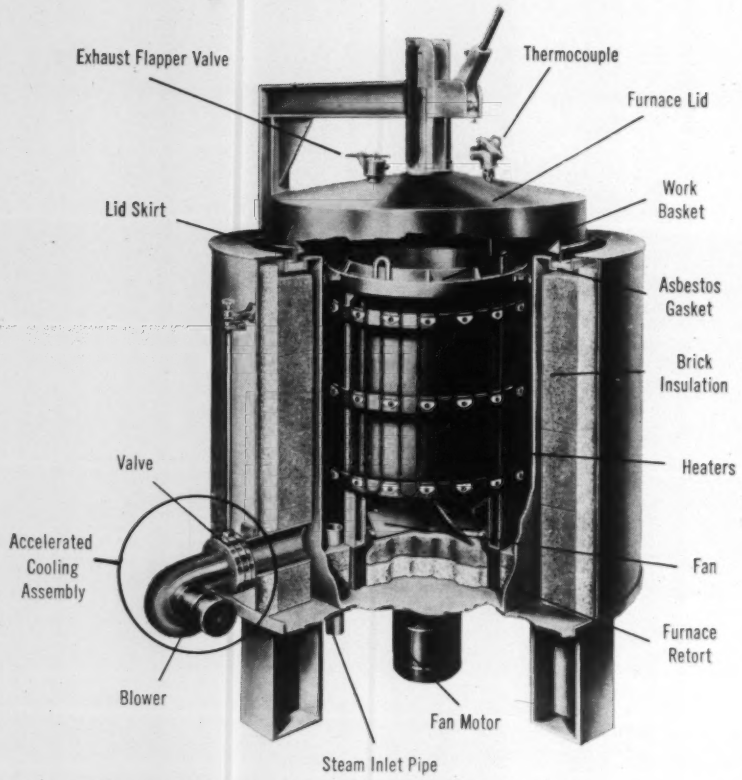
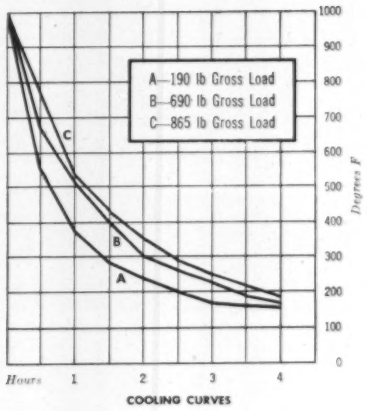




PROBLEM: To cut down cleaning cost of non-ferrous parts
SOLUTION: Heat treat and cool under protective steam

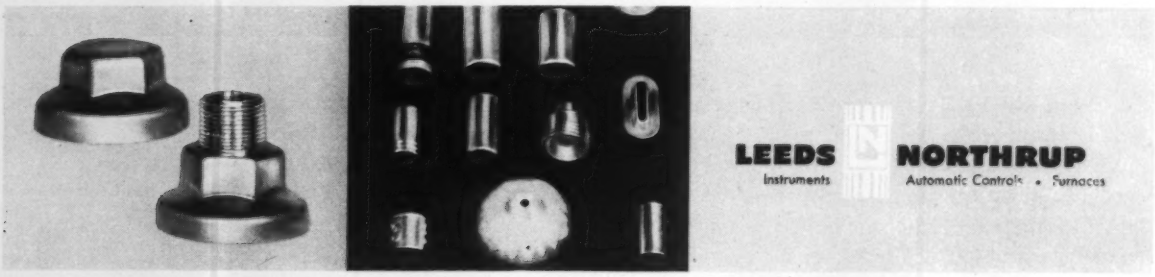
Plants fabricating parts from copper, beryllium copper, brass or bronze can now show appreciable savings in the cost of cleaning operations by the use of steam atmosphere heat treating.

Parts are age hardened, stress relieved or annealed in a steam atmosphere, then quick cooled to a safe temperature under the same protective atmosphere before removing from the furnace.

To make this practical on a production basis, L&N Steam Homo furnaces now incorporate a blower assembly to permit fast, uniform cooling under steam.

The result? Brass and copper parts formed by deep drawing do not require pickling after annealing between successive draws. Screw machine and blanked parts are now clean and scale-free after stress-relieving. The need for mechanical cleaning, pickling and rinsing these non-ferrous parts is eliminated. When parts are to be plated only a bright dip is necessary.

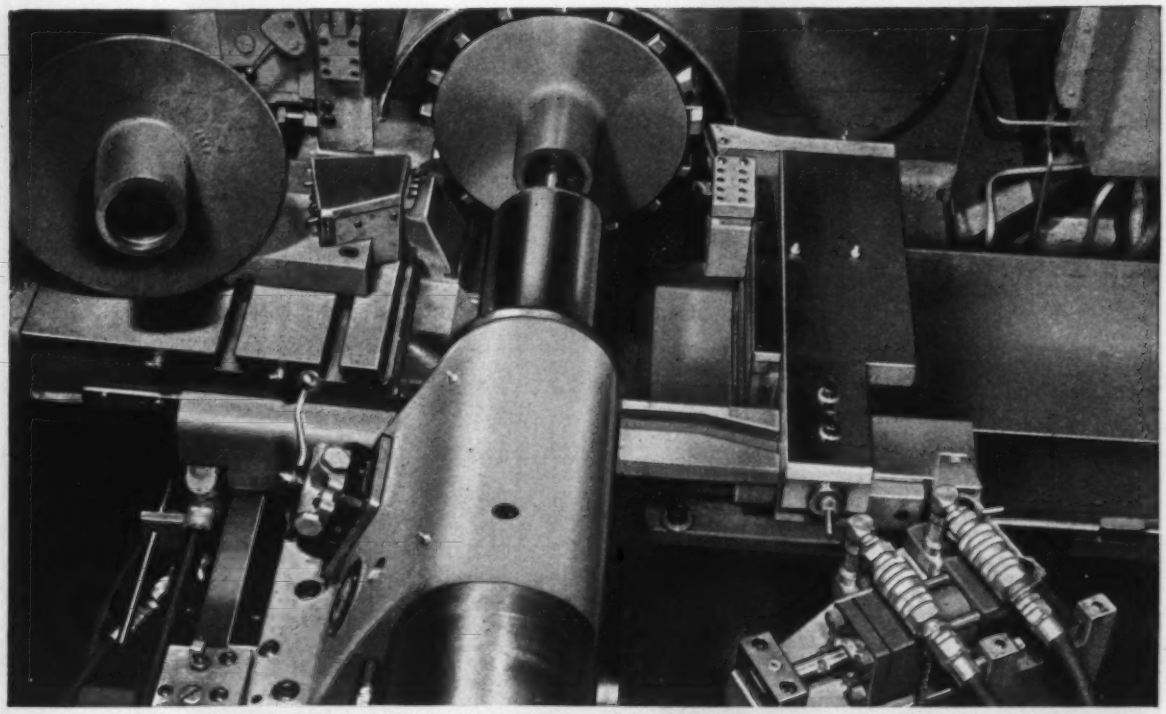
Why not see the results for yourself? Just send us a few samples of your parts . . . let us steam treat them and return them to you for evaluation. For more information about this service or a copy of our Catalog TD2-620(1) about the Steam Homo Method, contact your local L&N office or write us at 4957 Stenton Ave., Phila. 44, Pa.



LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

These brass radiator steam-vent shells require 9 draws, 4 anneals. With steam treating the manufacturer eliminated the pickle after each anneal and a heavy pickle before chrome plating . . . now uses only a bright dip, and has substantially cut buffing time.

When this manufacturer of lip-stick tubes and cosmetic containers installed a steam Homo furnace for annealing, pickling to remove scale was eliminated. Subsequent figures from the cost accounting department showed annealing costs reduced by 53%.



Note how 16-jaw chuck grips 10"-diameter, inner pulley disc on narrow portion of O.D. This permits machining entire flange face. Accurate taper is generated by cam-operated sliding toolholder shown at right.

No. 12 replaces two manual lathes, cuts time 53%

Automatic cycle, fast setup cut job-lot costs...free operator for other work.

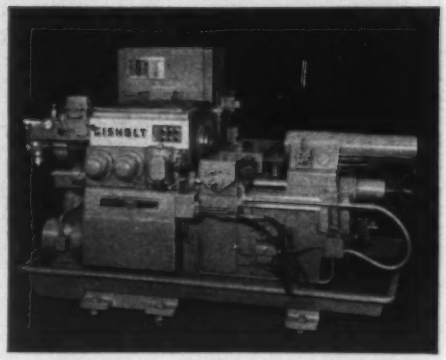
This fast, versatile setup may give you some new ideas on paring job-lot costs. Lewellen Manufacturing Company, Columbus, Indiana, uses it for machining three types of cast iron pulley discs in 15 sizes—in lots ranging from 50 to 100 pieces.

Previously this work required two manually operated lathes. Now one operator does the entire job 53% faster on one Gisholt No. 12 MASTERLINE Automatic Chucking Lathe.

Here's how a typical inner pulley disc, 10" in diameter, is handled: To permit machining beyond the tapered face, the work is held on a narrow portion of the previously turned O.D. in a 16-jaw chuck. A chuck-mounted mandrel with tailstock support provides rigidity for higher speeds and feeds.

Front carriage tools turn the hub O.D. within .0005" and form the base radius. The flange is taper-faced from a cam-controlled sliding toolholder on the rear independent slide. A second tool faces the hub end. Time, just 2.2 minutes, f.t.f.

Change-over for different sizes averages less than 30 minutes. One 30° adjustable cam handles all tapers. Quick-disconnect fittings are easily reversed for tool relief when changing from inner to outer discs.



Gisholt MASTERLINE No. 12 Automatic Chucking Lathe

FOR COMPLETE INFORMATION

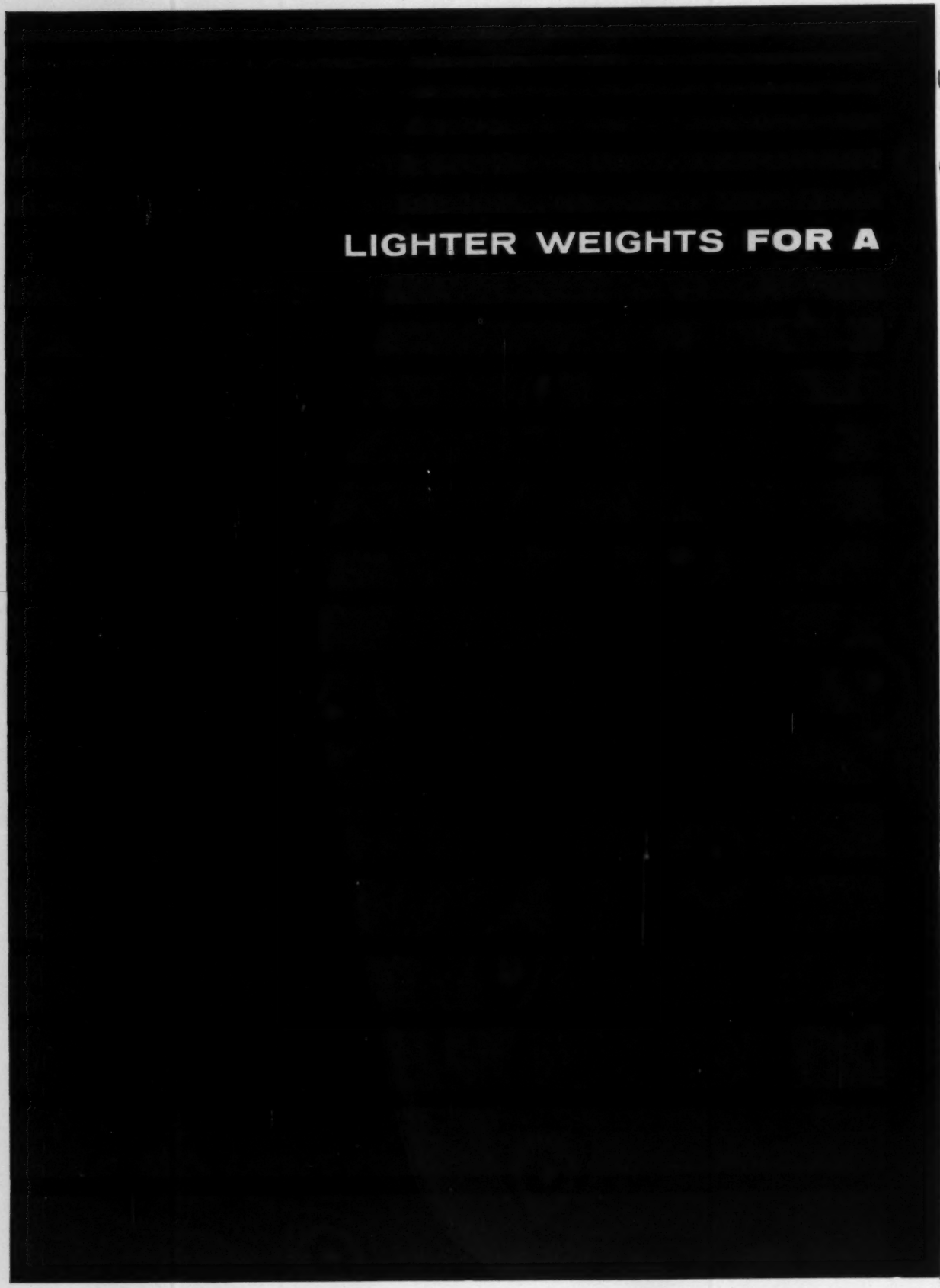
on how the No. 12 can cut your costs on job-lots and production runs, contact your Gisholt Representative—or write for new catalog, Form 1213.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee.

Investigate Gisholt's Extended Payment and Leasing Plans


LIGHTER WEIGHTS FOR A

HEAVIER PROFIT
Order a ton of stainless steel sheets and you receive a ton of stainless steel. But the square footage of that steel can differ.
Eastern's precision rolling holds the gauge toward the light side of recognized tolerances . . . actually delivers more area of stainless per ton. Result: Since you sell by the square foot, you earn more dollars per sale.
There's profit in precision rolled stainless from Eastern.
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stainless steel sheets, plates, strip, coils

ANNOUNCING A NEW CORPORATE NAME

for The Garlock Packing Company

Garlock Inc. becomes the new name for The Garlock Packing Company, Palmyra, N. Y., to reflect more accurately its broad diversification of products and markets.

Originally established to manufacture mechanical packings, Garlock now produces over 2,000 different styles of packings, gaskets, seals, molded and extruded rubber and plastic products for every major industry.

The new corporate name, Garlock Inc., more closely identifies this 73-year-old company with the growth and development of its product lines. *Today, industry goes to Garlock for such widely diversified products as:*

- Hydraulic-Pneumatic Packings
- Oil and Grease Seals
- Gasketing and Expansion Joints
- Braided Packings
- Molded and Extruded Rubber Parts
- Plastic Stock Shapes and Fabricated Parts
- Mechanical Seals for Rotating Shafts
- Metal Packings
- Leather Packings
- Electronic Components
- Dry Bearing Materials
- Fluorocarbon Tank Linings
- Missile and Rocket Components

To help you in selecting or applying these products, Garlock offers the services of over 126 thoroughly-trained sales engineers, 175 electronic component manufacturers' representatives, 180 authorized bearing distributors and 69 foreign distributors. Conveniently located warehouses and stocking points assure Garlock customers of prompt delivery.

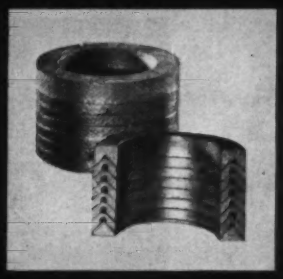
At Garlock Inc., design and development of new or improved products and materials is an ever-present objective. To this end Garlock maintains extensive research and laboratory-test facilities. In addition, Garlock engineers and chemists are always ready to work with you in seeking solutions to tough application problems.

GARLOCK

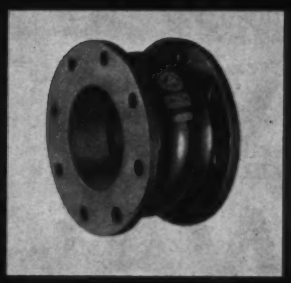
To find out more about "the new Garlock," call the nearest of our 26 sales offices, or write to Garlock Inc., Palmyra, N. Y. *To assure prompt attention,* please refer to *Garlock Inc.* on all future correspondence and orders.

Canadian Div.: Garlock of Canada Ltd.

Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.



Hydraulic-Pneumatic Packings

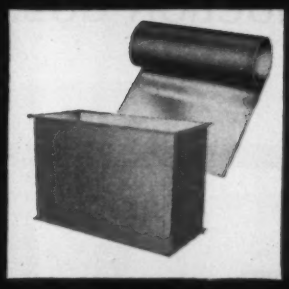


Expansion Joints

Molded and Extruded Rubber Parts

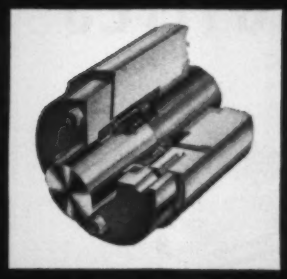
Plastic Stock Shapes
and Fabricated Parts

Braided Packings

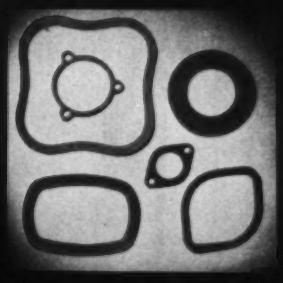


Fluorocarbon Tank Linings

Oil and Grease Seals



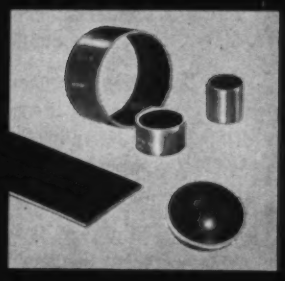
Mechanical Shaft Seals



Gasketing

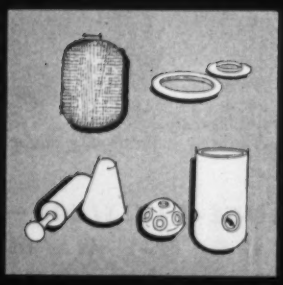
Spiral Wound Gaskets

Metal Packings

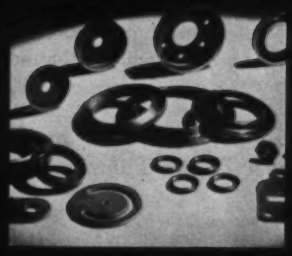


Dry Bearing Material

INC.



Missile and Rocket Components

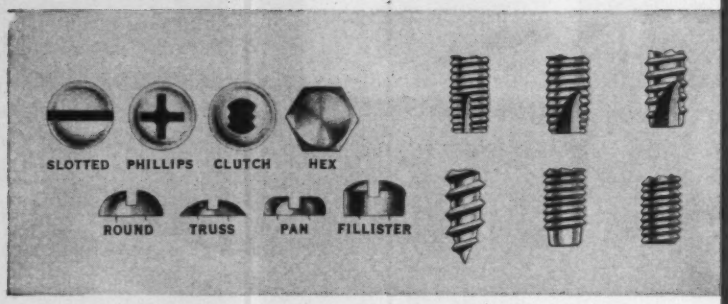


Leather Packings

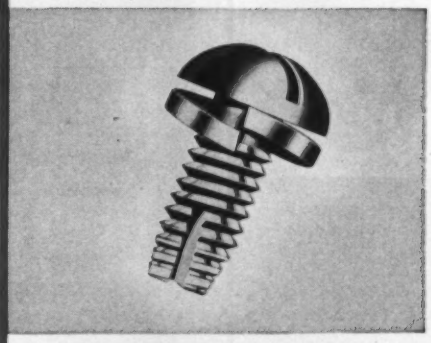
Electronic Components

SAVE 3 WAYS

on production costs



EATON-RELIANCE SPRINGTITES®



1. Speed up assembly by reducing the number of motions on the production line with Eaton-Reliance Springtites —which are bolts or screws preassembled with spring washers. Scientific light-line studies prove many motions are eliminated by using these fasteners.
2. Keep inventory balanced and make stock handling easier by always having the number of spring washers equal that of the screws or bolts. This also saves on paper work by reducing the number of stock requisitions and orders.
3. Minimize "sweep-out" waste by using one preassembled fastener instead of two fastener components. Being easier to pick up, springtites are less apt to be dropped, lost and wasted. In hopper-fed operations, preassembled fasteners are more efficiently and easily handled.

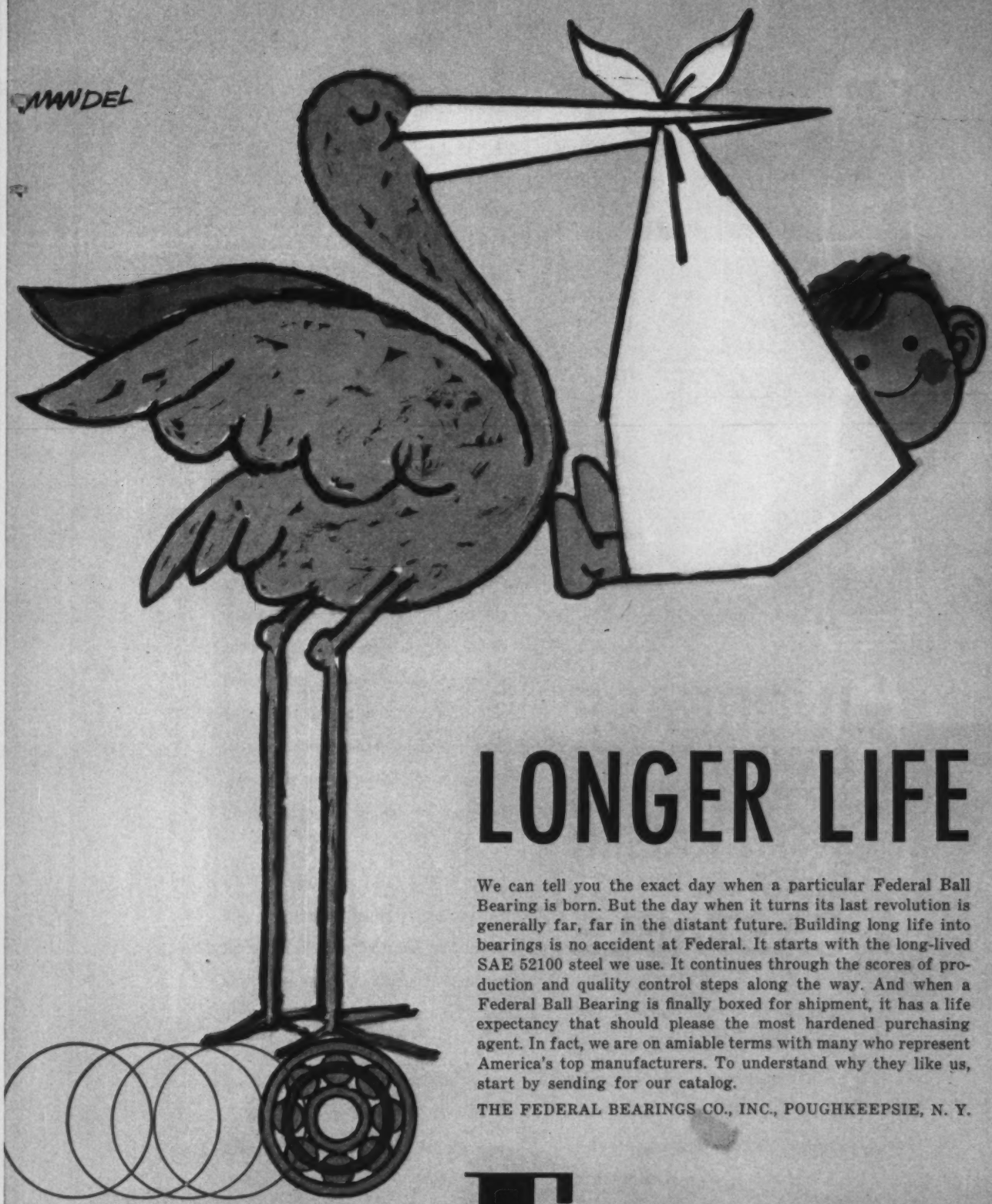
Eaton-Reliance Springtites are made from top quality steel, cold drawn to rigid specifications in the Reliance mill.

Write for our new 16 page full line catalog containing complete information.

EATON

RELIANCE DIVISION
MANUFACTURING COMPANY
514 CHARLES AVENUE • MASSILLON, OHIO

SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Los Angeles



LONGER LIFE

We can tell you the exact day when a particular Federal Ball Bearing is born. But the day when it turns its last revolution is generally far, far in the distant future. Building long life into bearings is no accident at Federal. It starts with the long-lived SAE 52100 steel we use. It continues through the scores of production and quality control steps along the way. And when a Federal Ball Bearing is finally boxed for shipment, it has a life expectancy that should please the most hardened purchasing agent. In fact, we are on amiable terms with many who represent America's top manufacturers. To understand why they like us, start by sending for our catalog.

THE FEDERAL BEARINGS CO., INC., POUGHKEEPSIE, N. Y.

FEDERAL ON FILM—A 16 mm. color sound film takes you through our 400,000 sq. ft. plant. Loaned free. Just ask for it.

Federal

BALL BEARINGS

One of America's Largest Ball Bearing Manufacturers

INCREASE CAMPAIGN LIFE UP TO 18 MONTHS WITH KAISER BLAST FURNACE CASTABLE*

WHAT IS KAISER BLAST FURNACE CASTABLE? It is a dry-mix gunning material for the full range of blast furnace lining, including area below the tuyeres. The material is a hydraulic setting, high strength clay product made with a very pure calcium aluminate binder (low in iron to resist effect of CO disintegration, and high in strength to resist abrasive conditions).

WHEN SHOULD IT BE USED? Kaiser Blast Furnace Castable was developed specifically to provide a quick, economical and dependable means of prolonging furnace life without a major reline. Thus, it may be used when a furnace must be kept on the line to meet heavy production schedules, or it may be used to improve production economy by extending normal productive life of a furnace.

HOW FAST CAN THE MATERIAL BE PLACED? When down time is an important consideration, Kaiser Blast Furnace Castable can be gunned into place—around the clock—at a rate of up to 9000 pounds per hour per gunning unit. Service can be resumed in a fraction of the time needed for other methods of repair or rebuild! Curing is accomplished with normal heat-up procedure. (Actual down time varies, of course, with amount of surface preparation—cleaning slag, coke, limestone, etc. from the existing brickwork.)

WHAT IS THE COST AS COMPARED TO BRICK? Cost of actual repairs made with Kaiser Blast Furnace Castable is only about one-fourth the cost of repairs made with brick. Even more important, cost- and profit-wise, is the additional iron production made possible by increased campaign life.

HAS KAISER BLAST FURNACE CASTABLE BEEN PROVED IN SERVICE? Yes. The three locations described at right show the range of installations now in service.

*Formerly MEX-R-CO BF Blast Furnace Castable.

LOCATION NO. 1: 28-ft. diameter furnace, capacity 2900 N. T. per day. 267 tons Kaiser Blast Furnace Castable installed, starting at tuyeres and extending to wear plates. Thickness of material varies from 6 to 26 inches. Total installation time: 30 hours.

INCREASED CAMPAIGN LIFE: 15 months (and still in service)

LOCATION NO. 2: 20-ft. diameter furnace. 65 tons Kaiser Blast Furnace Castable installed, beginning slightly below tuyeres and extending upward toward mantle. Thickness of material varies from 4½ to 13½ inches. Total installation time: 24 hours.

INCREASED CAMPAIGN LIFE: 12 months (and still in service)

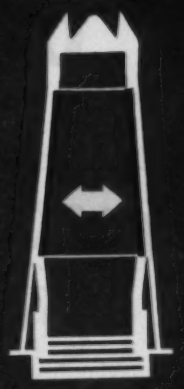
LOCATION NO. 3: 28-ft. diameter furnace, capacity 3300 N.T. per day. 300 tons Kaiser Blast Furnace Castable installed: one section extending from mantle upwards 25 feet with average thickness of 16 inches; second section extending from wear plates downwards 10 feet, with average thickness of 7 inches. Total installation time: 29 hours.

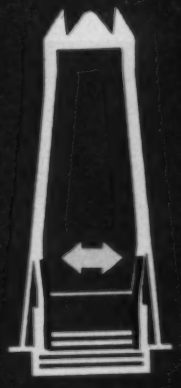
INCREASED CAMPAIGN LIFE: 17 months

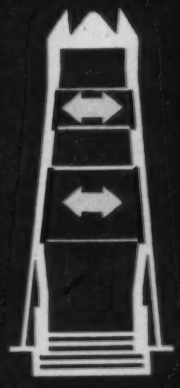
For full details on these installations — and to learn how you can achieve increased campaign life — contact your Kaiser Refractories sales representative.

Call or write Kaiser Refractories and Chemicals Division, Dept. 5022E, Kaiser Aluminum & Chemical Sales, Inc., at any of the Division Offices listed below:

PITTSBURGH 22, PA. . . . 3 Gateway Center
MEXICO, MISSOURI . . . . Main & Co. Building
OAKLAND 12, CALIF. . . . 300 Lakeside Drive







KAISER REFRACTORIES

MODERN REFRACTORIES NOW DESIGNED WITH KAISER REFRACTORIES: BEE-A-CO High Alumina, Fire Clay and Silica Refractories • Kaiser Refractory Brick, Mortars, Coated and Bonding Mixes

CF&I Heavyweight Shaped Coils

PACKAGED for YOUR PRODUCTION

Mr. Marwil points out in-plant handling and unloading is more efficient and economical with CF&I Shaped Coils than with mill coils. Shaped coils can also be stored more compactly.

give long production runs at Marwil Products Co.

With a 12 million unit annual capacity, Marwil Products Co., Fort Loramie, Ohio, is rated as the largest U. S. manufacturer of muffler clamps and U-bolts. Nine months ago the company switched to CF&I Wire. Mr. William Marwil, Vice President tells why:

"We find CF&I's 2000 lb. shaped coils of clean, bright basic wire are very uniform, with no 'thin' areas or rough finish. These large coils give us longer runs without the necessity for frequent set-ups on our Lewis Cut Off machines."

In addition to the high quality of CF&I Wire, new packaging methods have increased the preference for CF&I Wire.

Replacing small, light-weight coils are CF&I Shaped Coils and spiders. The spider, leased from CF&I, acts like a spool, and pays off the wire evenly and smoothly. Now, instead of losing hours of production time every day in changing small coils or unravelling tangled wire, *one* CF&I Shaped Coil can usually last many hours. The shaped coils and spiders make for easier handling and storage, too.

One of our salesmen will be glad to recommend the right "package" to increase your production and cut manufacturing costs. You can call your nearest CF&I sales office today and arrange a "no obligation" visit.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

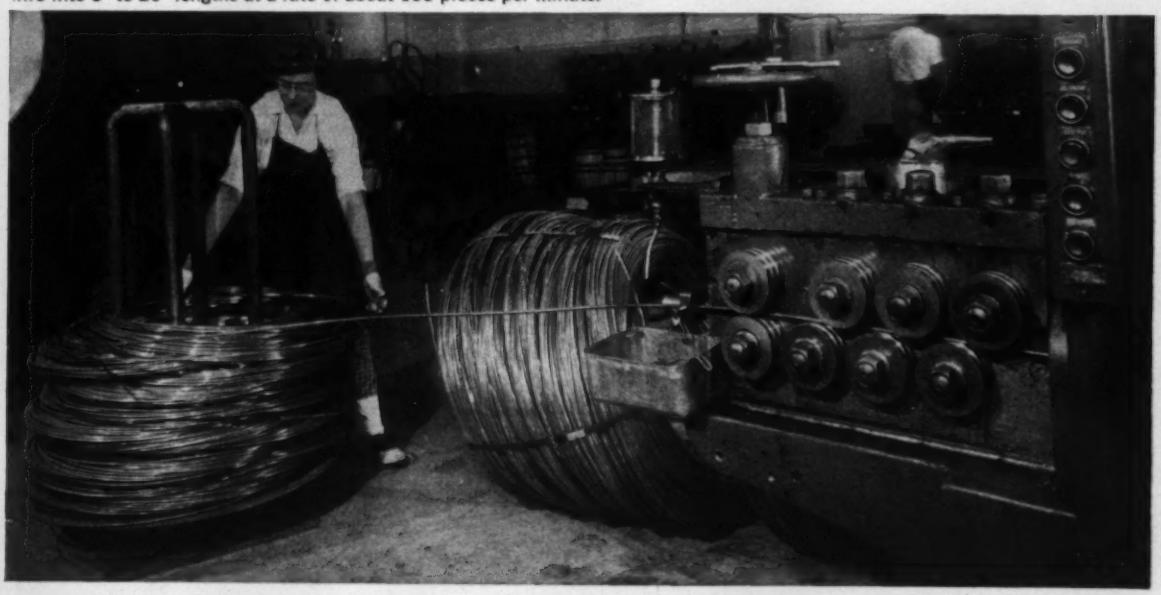
7348

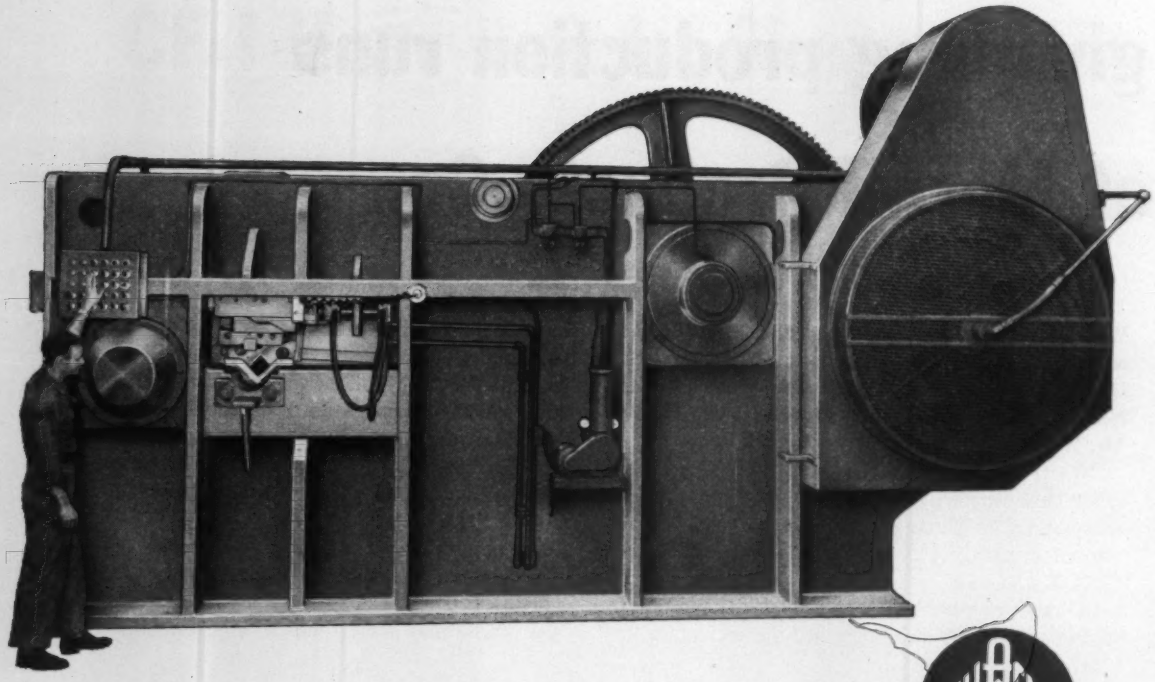
In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

CF&I Wire being fed into the Lewis Cut Off machine. This machine cuts wire into 5" to 20" lengths at a rate of about 150 pieces per minute.





HILL ACME
HEAVY DUTY BAR-BILLET SHEAR
for production cutting of heavy billets

SIMPLE DESIGN The No. 1200 HILL ACME BAR-BILLET shear cuts large diameter squares of various tensiles. The basic principle of the lever and fulcrum is employed to insure maximum efficiency with low power input.

HIGH PRODUCTION With a free running speed of 26 cuts per minute the production of square, accurate lengths will appreciably reduce cutting costs.

VERSATILE Knives will accommodate many sizes of rounds, flats, squares or special shapes without the necessity of knife change.

LOW COST Initial machine cost is attractive and maintenance cost comparisons are impressive.

PROVEN EFFICIENCY Now proven through four years of successful operation in nationally known plants. Available with fully automatic, semi-automatic or hand feed.

SIZE RANGE HILL ACME BAR-BILLET shears are made in a range of sizes to efficiently accommodate every commercial requirement. Available in either right or left hand models.

Bulletin BB-59 gives complete details.

MMT-PE

The HILL ACME Company

Also manufacturers of:
ROTARY SHEARS • "CANTON" ALLIGATOR SHEARS • HILL HYDRAULIC SURFACE GRINDERS • GRINDING & POLISHING MACHINES • "ACME" FORGING • TAPPING MACHINES • "CLEVELAND" KNIVES AND SHEAR BLADES • MECHANICAL LIFTERS

1201 West 65th St., Cleveland 2, Ohio

What's YOUR Wire Problem ?

• PAGE manufacturers wire is a logical choice for hundreds of wire products. Whether you make hairpins or lock washers, paper clips or mattress springs, PAGE wire will give you the tensile strength, ductility, finish, tolerance and other properties you require. Regardless of your use of wire, you can count on PAGE uniformity.

PAGE facilities are designed to produce a wide range of high quality manufacturers wire items—including special shapes. Where requirements are exacting, you will find PAGE wire unexcelled.

Since 1902 we have pioneered many "firsts" in the wire industry. The latest of these is corrosion-resistant ACCO *Aluminized* Wire—commercially pure aluminum bonded to a steel core.

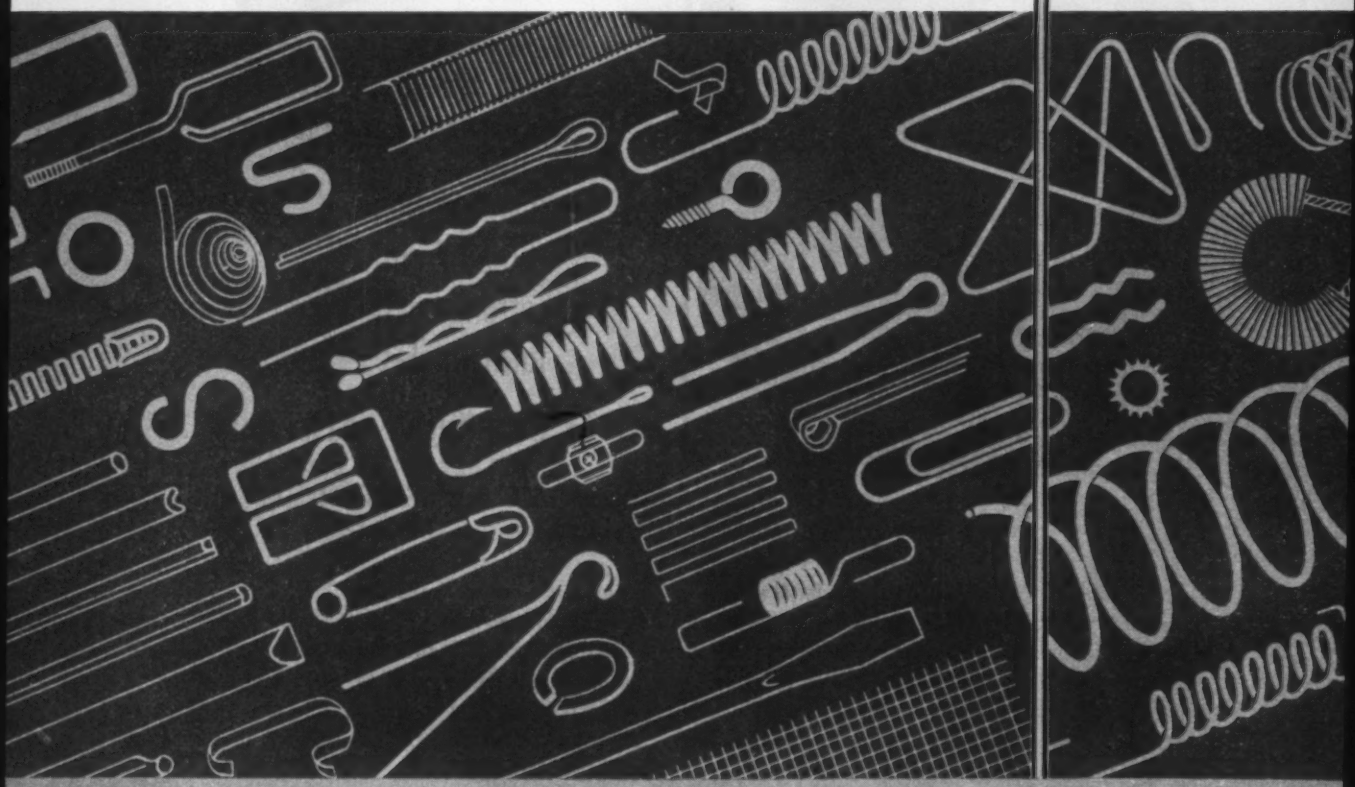
LET'S TALK WIRE! *Get in touch with us for your wire needs. Gain the benefit of* PAGE *experience and "wire know-how" to improve your product and lower your costs.*

ACCO

PAGE MANUFACTURERS WIRE

Page Steel and Wire Division • American Chain & Cable Company, Inc.

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.



PAGE *—the source for answers to wire problems*

DELROYD

WORM GEAR SETS

Check these advantages:

- Involute helicoid thread form (strongest thread form made)
- Centrifugally cast gears
- More horsepower per dollar

Delroyd units are manufactured in a modern plant devoted specifically to the production of worm gearing—a plant which has one of the largest thread milling and thread grinding capacities in the United States. Because we use this exclusive precision machinery, the most exacting testing techniques and highly skilled workmanship, you are assured of quality and service associated with the leading specialists in worm gearing.

Delroyd provides the widest range of sizes and ratios, and offers complete interchangeability of parts. Whether you specify worm gear sets or worm gear speed reducers, you are assured of the finest quality obtainable.

DE LAVAL *Steam Turbine Company*

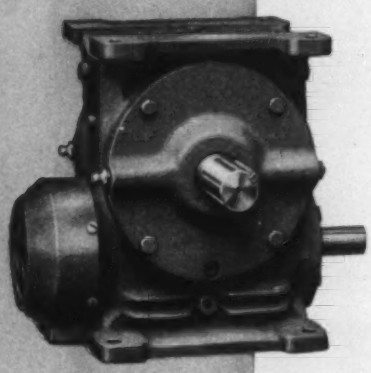
860 NOTTINGHAM WAY, TRENTON 2, N. J.

DELROYD

WORM GEAR SPEED REDUCERS

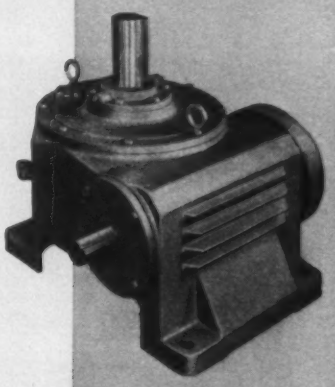
FAN COOLED RIBBED CASES

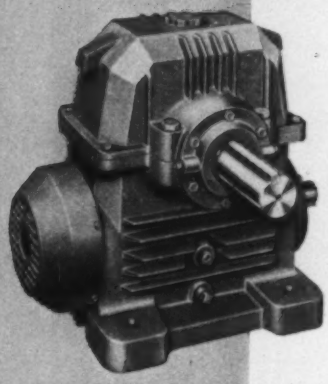
Widest range of ratings available—from .05 HP, 1⅛" center distance to 1050 HP, 36" center distance—in single and double reduction units



TYPE D
Verso Unit
Adapts to any mounting requirement
Ratios:
5:1 to 70:1
Horsepowers:
.062 to 13.5
Center distance:
2½" to 4"

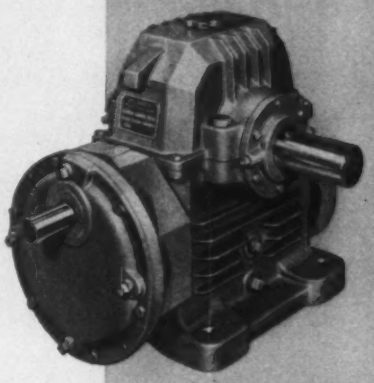
TYPE V
Vertical single reduction
Shaft up or down
Ratios:
5:1 to 70:1
Horsepowers:
.062 to 150
Center distance:
5" to 12"

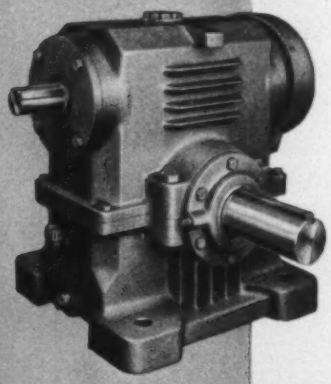




TYPE B
Horizontal single reduction
Bottom drive
Ratios:
5:1 to 70:1
Horsepowers:
.062 to 150
Center distance:
5" to 12"

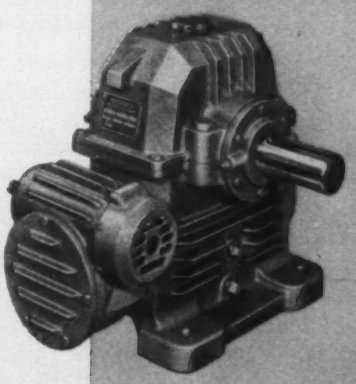
TYPE HB
Horizontal helical-worm
Right angle drive
Ratios:
15:1 to 355:1
Output torque:
2460 in. lbs. to 135000 in. lbs.
Center distance:
3½" to 12"





TYPE T
Horizontal single reduction
Top drive
Ratios:
5:1 to 70:1
Horsepowers:
.062 to 150
Center distance:
5" to 12"

TYPE DB
Horizontal double-worm
Parallel input and output shafts
Ratios:
75:1 to 4900:1
Output torque:
4170 in. lbs. to 135000 in. lbs.
Center distance:
3½" to 12"



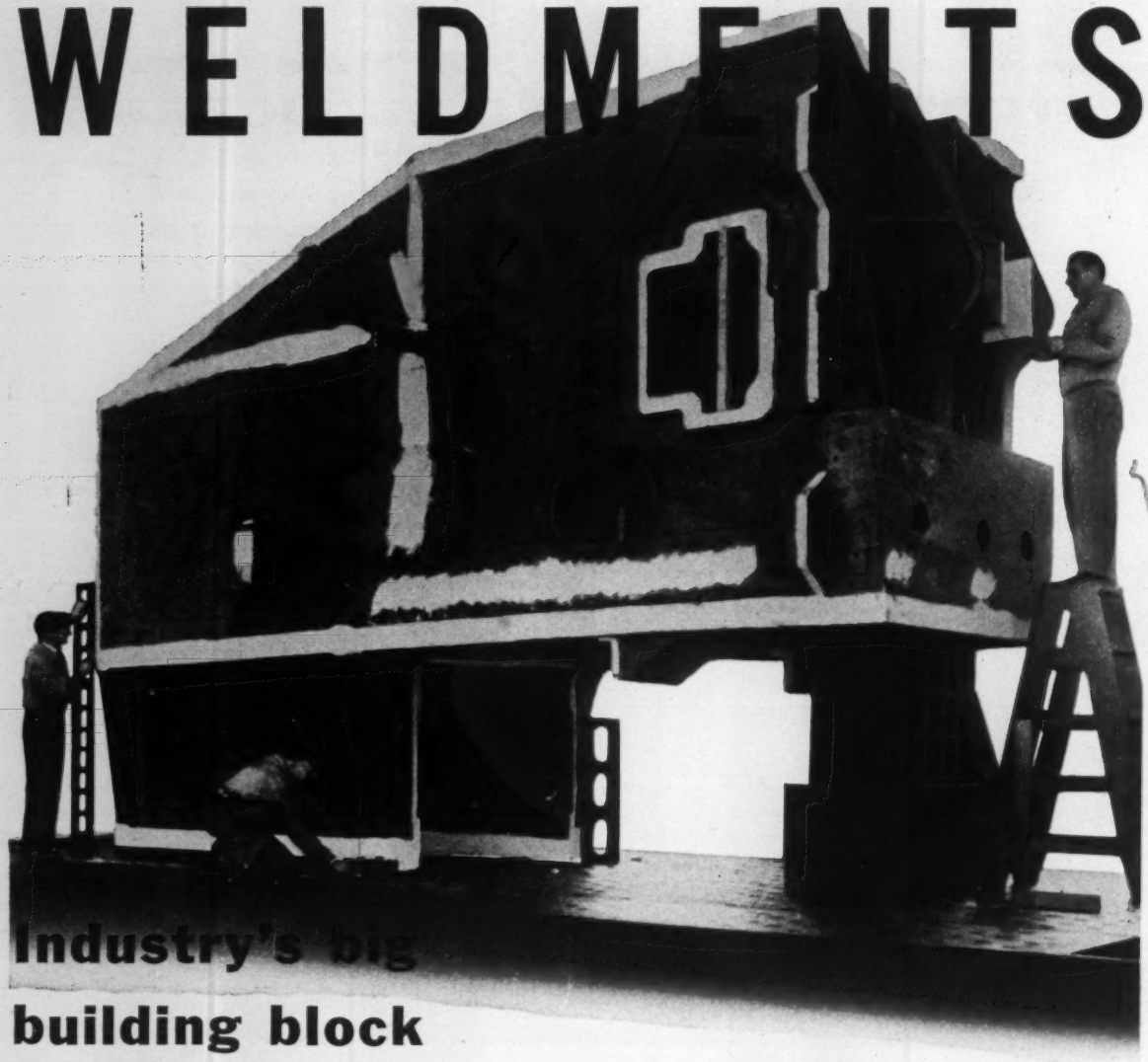
Prompt delivery from stock—all units through 12 inch center distance

DE LAVAL *Steam Turbine Company*

860 NOTTINGHAM WAY, TRENTON 2, N. J.

PL-420

WELDMENTS



Industry's big building block

You're looking at a 55-ton weldment on a planer. It is typical of the machining—or building of a complete machine of any size—produced regularly in the Sun Ship machinery plant where marine and industrial equipment is built.

In our tank and steel fabricating shop, we build pressure vessels, fractionating towers, weldments, and heavy steel fabrications.

Our completely integrated shops concentrate facilities and skills for producing special machinery and components that meet the most critical standards.

When you need special machinery of any kind, you will want to discuss methods, equipment requirements and possible production layouts with Sun Ship's sales engineers.

Sun

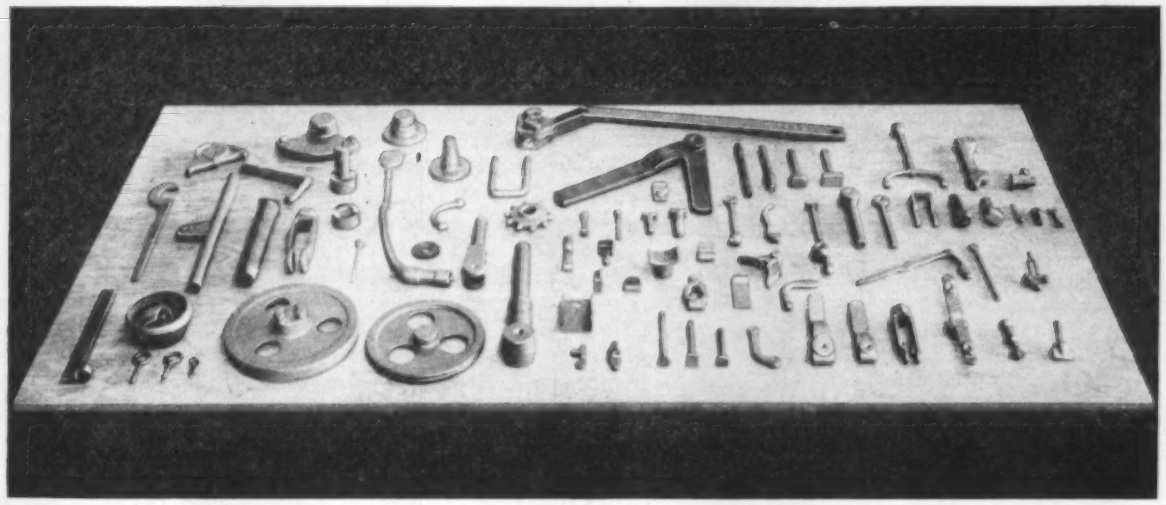
SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

200 Different Parts Heated for Forging -

Better, Faster and at Much Lower Cost

with TOCCO Induction Heating*



• When progressive production people at General Railway Signal Company installed a 200 kw, 3000 cycle TOCCO machine, they were able to eliminate 7 slot-type oil-fired furnaces and produce better forging than ever before—at substantially lower costs.

Cost Down—Fuel costs have been reduced from $15.26 to $1.60 per hour with TOCCO. Expensive furnace lining maintenance has been eliminated, and straightening and reheating operations formerly required are no longer necessary.

With oil-fired furnaces all steam hammer operators needed helpers. With TOCCO most of these helper operations have been eliminated.

TOCCO's fast, automatic operation produces almost no scale and achieves uniform temperatures throughout the entire cross section—improving the quality of the forgings and providing increases of up to 400% in the life of the forging dies.

Overall production costs in the forge shop at G.R.S. have been reduced an impressive 35%!

Flexibility—Production runs at G.R.S. range from a low of 15 pieces to a high of over 50,000. Parts from ½ pound to over 25 pounds are heated, merely by changing inductor coils and power control settings.

Better Working Conditions—TOCCO makes the forge shop a better place to work by doing away with noise, dust, dirt, smoke and radiant heat and gases produced by old fashioned furnaces.

If you're looking for a way to produce similar results in your plant, it will pay you to consult a TOCCO Engineer.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept: S-5, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forming and Forging".

Name_____

Position_____

Company_____

Address_____

City_____ **Zone**____ **State**_____

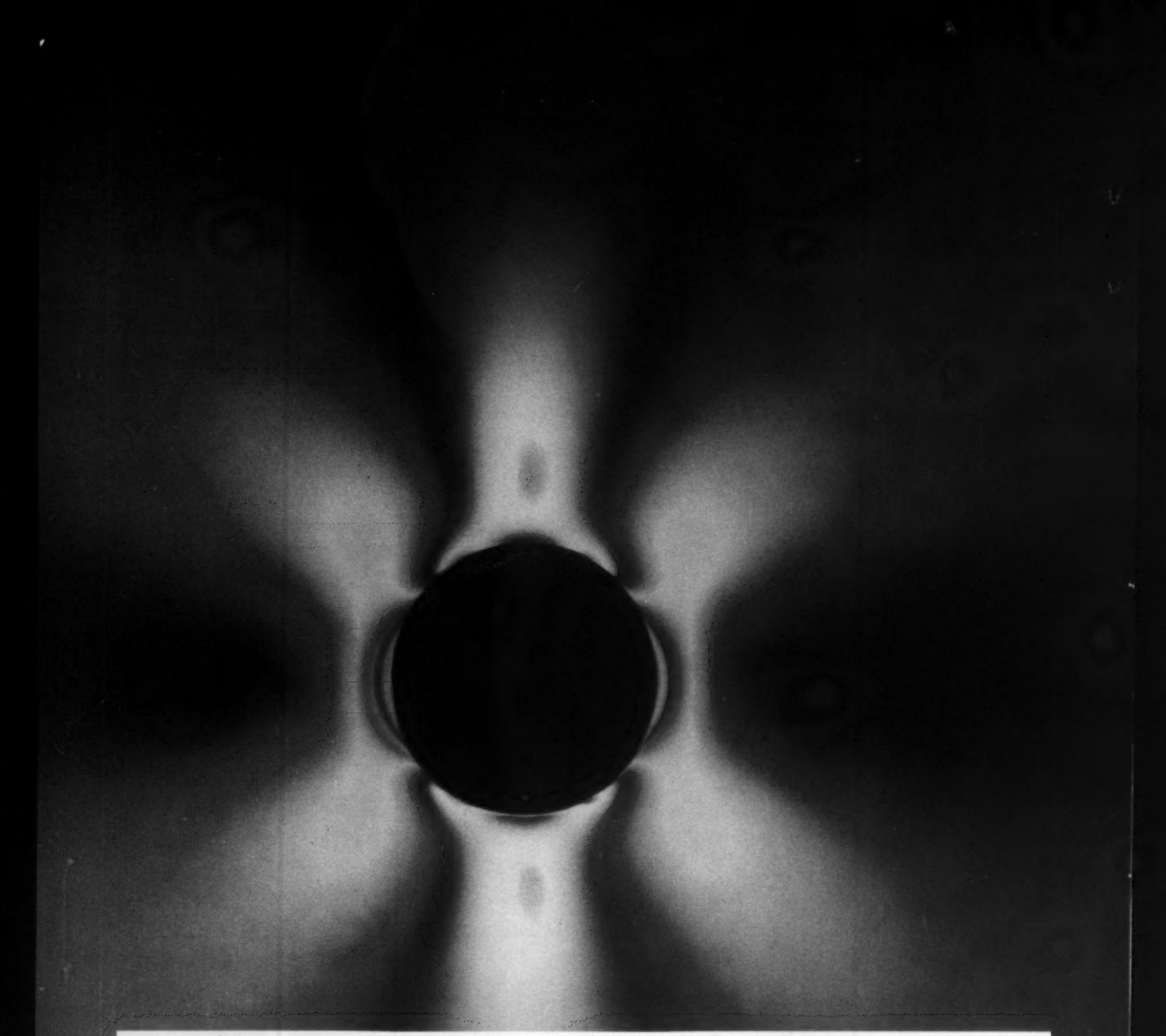


Photo-elastic stress patterns produced by models photographed with polarized light are one of the modern analytic tools available for ever-increasing perfection of Malleable iron castings.

For Greatest Strength Per Dollar... Use Malleable

To improve quality and cut costs, you'll find nothing better than Malleable iron castings. They provide more strength per dollar than any other metal, ferrous or non-ferrous! With Malleable you also get proven toughness, uniform quality and unsurpassed machinability.

See for yourself how much Malleable castings will improve your products and cut your costs. Send drawings or an outline of your requirements to a nearby Malleable castings producer who displays this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

For detailed information on "Strength Characteristics of Malleable Iron Castings", contact any of the progressive companies listed on the opposite page, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

"Value Analysis" Proves–

Malleable Castings Improve Quality, Reduce Costs

When "Value Analysis" is your task, consider these outstanding advantages of Malleable iron castings: more strength per dollar than any other metal, ferrous or non-ferrous; exceptional machinability; metal exactly and only where it is needed; job-proven toughness.

Switch to Malleable Saves 47% on Railroad Car Thrust Collar

One of countless examples of cost reduction obtained by changing from other materials or processes to Malleable castings is this thrust collar used on railroad maintenance cars. While the steel part formerly used performed satisfactorily, it cost 99¢ before machining.

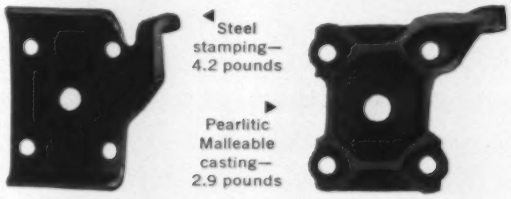
The cost of the standard Malleable casting before machining is only 51.7¢ — a saving of 47.3¢! Added to this, four machining operations — drilling of bolt hole, spot facing for bolt head and nut, milling the sleeve slot and sawing the transverse slot — were eliminated by switching to a casting. All remaining machining operations are improved due to Malleable's exceptional machinability.

Former part before machining (99¢)

Malleable casting before machining (51.7¢)

Cost Cut 15% on Spring Bracket by Using Malleable Producer's Engineering Services

This automotive rear spring bracket was originally a steel stamping, S. A. E. 1015, .438 stock, designed to withstand 800 pounds maximum push or pull load on the shock absorber ear. Casting design experience coupled with use of stress analysis techniques by the foundry's designers reduced weight from 4.2 pounds to 2.9 pounds while increasing the part's yield strength to nearly 3,000 pounds. Result: the pearlitic Malleable bracket performed better . . . cost 15% less!



Cost-Saving Engineering Assistance Available

The kind of engineering assistance that cut costs and improved product quality for these companies and thousands of others is available to you from any of the progressive producers of Malleable castings that are members of the Malleable Castings Council. Start increasing your product profitability right now — contact any of the companies listed below.

Free Information Folder

Your copy of an informative folder, *Data Unit 110—Malleable Castings in the Value Analysis Spotlight*, is available free from the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, or from any member company.

For Quality and Economy... Use MALLEABLE

For Service In Your Area Contact...

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

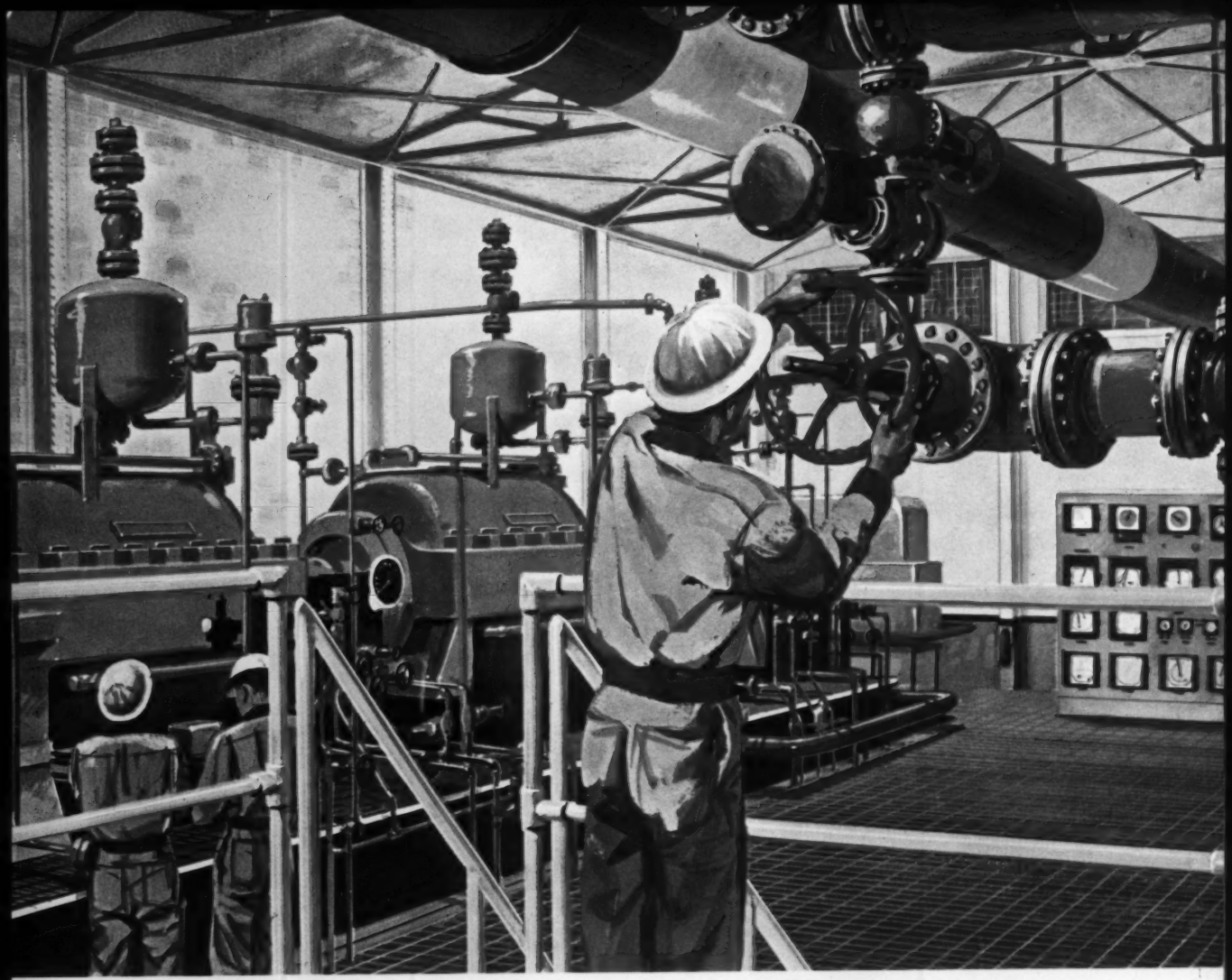
OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

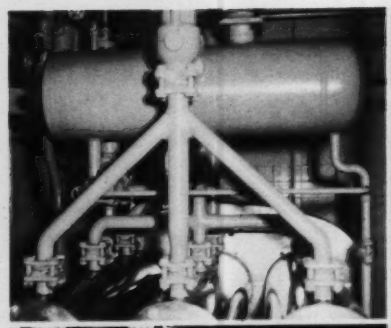
PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

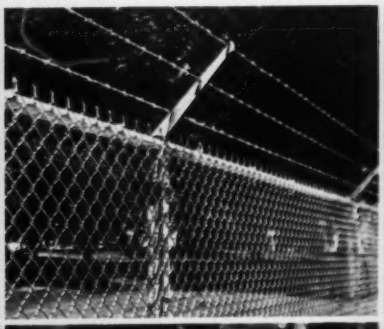
TEXAS
Texas Foundries, Inc., Lufkin

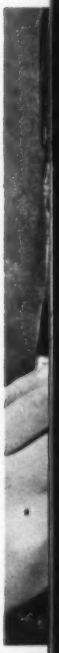
WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

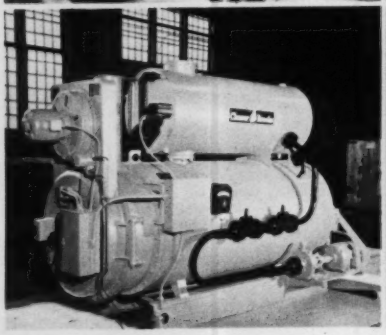
WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 45

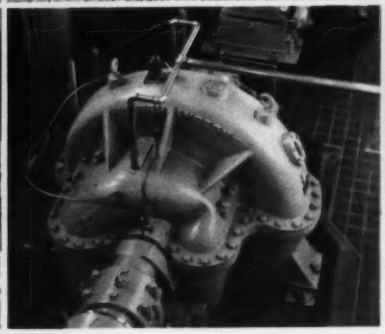


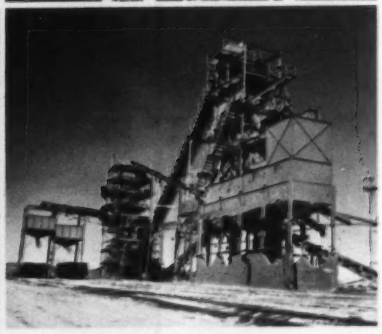


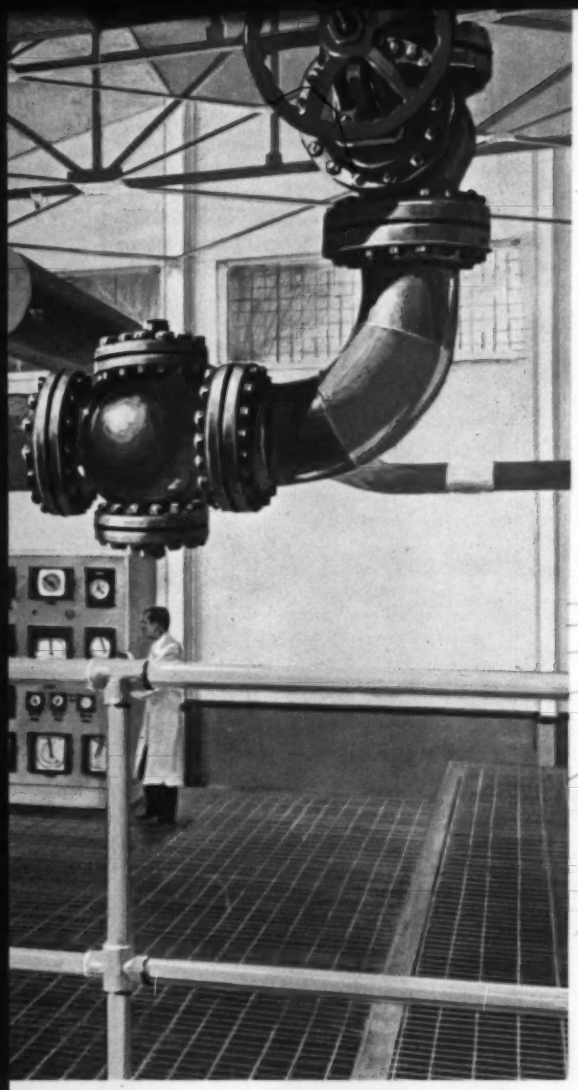












Rust-Oleum

NEW COLOR HORIZONS

System

HERE is a modern, functional *system* that combines four important points. (1) the ability to stop rust, (2) modern color harmony, (3) durability to last and last, (4) ease of application. From machinery, equipment, and structural steel to tanks, steel fences and metal sash – the Rust-Oleum New Color Horizons System can provide lasting beauty in the colors of your choice. Ask your Rust-Oleum Industrial Distributor, together with your Rust-Oleum Factory Specialist, to make a survey of your plant and provide complete recommendations. Rust-Oleum Industrial Distributors maintain complete stocks for prompt delivery in all principal cities of the United States, Canada, and in many countries around the world.

Rust-Oleum, in its various forms, can also save you time and money on problems like these: Heat Resistance, Water Resistance, Chemical Resistance, Coating Galvanized Metal, Speedy-Dry Coatings (less than thirty minutes to dry).

PROVED THROUGHOUT INDUSTRY FOR OVER THIRTY-FIVE YEARS

RUST-OLEUM®

See our catalog in Sweet's.

STOP RUST by applying Rust-Oleum 769 Damp-Proof Red Primer directly over the sound rusted surface

Save time, money, and metal. Brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining sound rusted surface after scraping and wirebrushing to remove rust scale and loose rust. **Specially-processed** fish oil vehicle penetrates rust to bare metal as proved in radioactive tracing studies.

STOPS RUST!®

Distinctive as your own fingerprint. There are imitations, but only one Rust-Oleum.

Insist upon industry-proved Rust-Oleum. Accept no substitute.

You take the brush! Try a free test sample!

ATTACH TO YOUR LETTERHEAD

RUST-OLEUM CORPORATION
2985 Oakton Street • Evanston, Illinois

At no cost or obligation, please send me:

- ☐ New full-color catalog on New Color Horizons System and specialized Rust-Oleum systems, including color charts and applications.
- ☐ FREE TEST SAMPLE of Rust-Oleum 769 Damp-Proof Red Primer.
- ☐ Please have your representative contact us to discuss a plant survey.

METALOGICS*

steps up your profits by keeping quality consistent

Run No. 1 . . . run No. 1001—you cut costly delays and adjustments *out* of production flow when you rely on *consistent quality* material from Ryerson. Metalogics brings you a brand-new set of rigid quality-control standards—on steel, aluminum, plastics and metal-working machinery—that are completely detailed and published for your scrutiny. They govern every aspect of specifications, verification, packaging, cutting and certification of all Ryerson products.

But that's only part of the exciting Metalogics story. Get the rest from your Ryerson representative soon.

* The Ryerson science of giving optimum value for every purchasing dollar.

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RYERSON PLUS VALUES

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

PLANT SERVICE CENTERS: BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • HOUSTON • INDIANAPOLIS
LOS ANGELES • MILWAUKEE • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • SPOKANE • WALLINGFORD

PAs Are More Optimistic

The National Association of Purchasing Agents reports the findings of its April survey: New orders—32 per cent say up; 20 per cent say down. Production—26 per cent say up; 18 per cent, down. Employment—13 per cent say up; 26 per cent, down. Inventories—26 per cent say lower; 25 per cent say higher.

USW Rebels Draft Plan to Oust McDonald

In Pittsburgh last week, some 80 rank-and-file Steelworkers gathered to map a campaign aimed at dethroning David J. McDonald's supporters in local elections next month. The group also hopes to oust Mr. McDonald and his district directors when they stand for re-election in February. The rebels (they call themselves the "Organization for Membership Rights") have formulated two goals: 1. To require a unionwide vote before an industrywide strike can be called. 2. Cut the annual salaries of the union's international officers.

Metalworking's First Quarter Profits Mixed

The First National City Bank of New York analyzed first quarter earnings reports for 812 corporations. It made these comparisons of net profits:

	% Change from 4th Q 1959	% Change from 1st Q 1959
Iron & steel	+117	+8
Electrical equipment	−39	+7
Machinery	−16	+27
Autos & parts	+79	+6
Other transportation equipment	−9	−9
Other metal items	+4	−3
Tires, rubber products	+3	−4
Chemical products	+2	+5
Cement, glass & stone	−21	+2
Railroads	−43	−1

Three Industries Note Sales Gains

March new orders for foundry equipment jumped 25 per cent above the February level for the best month since March, 1959, the Foundry Equipment Manufacturers Association reports . . . March shipments of industrial fasteners inched up slightly from the February level to equal those of the year-earlier month, Industrial Fasteners Institute says . . . Factory sales of transistors in the first two months of 1960 total $49.5 million—up 81 per cent from the like 1959 period, notes Electronic Industries Association.

Fantastic Growth for Data Processing; Color TV Sales Up

The use of electronic data processing systems is expanding so rapidly that "this area alone can double the size of RCA within the next decade," predicts John Burns, president, Radio Corp. of America. He adds that first quarter sales of color TV receivers showed a record quarterly increase—40 per cent above the year-earlier period. RCA plans to double the color TV produc-

Technical Outlook—Page 95 Market Outlook—Page 133

tion capacity of its Bloomington, Ind., plant. First quarter sales of portable radios jumped 72 per cent above the year-earlier mark, Mr. Burns reports.

Boeing Offers Machine Programing Service

Boeing Airplane Co. has inaugurated a numerical control service for industry. The company will market a custom service in machine programing of parts, tools, dies, and templates and offer complete preparation of tapes for numerically controlled machine tools. It will also offer consulting services, personnel training, and preparation and verification of punched and magnetic tapes. In the photo: Unique machine, designed by Boeing, verifies three dimensional control tapes. It finds any errors made in tape preparation.

Galvanized Steel Demand to Soar

"Demand for galvanized steel can be expected to increase sharply during 1960's second quarter," predicts Seymour Waldman, president, Rolled Steel Corp., Skokie, Ill. In the last two weeks, the firm experienced a 30 per cent jump in galvanized steel orders. Because building was curtailed by bad weather, galvanized demand is coming later this year than normal.

Davy Crockett Will Take 2 Million Lb of Titanium

The Army's newest, portable, recoilless gun—capable of firing atomic shells—will be built of titanium. Dubbed the Davy Crockett, it will operate at temperatures of −65° F to 125° F. About 2 million lb of titanium will be required over the next five years to fabricate the gun, Titanium Metals Corp. of America estimates. Total titanium shipments last year were about 6.5 million lb. The heat treated titanium barrel has a strength level of 105 tons per square inch.

Computers Go from Slaves to Masters

Electronic computers may soon be forced to learn supervisory skills. Bendix Aviation Corp.'s G-20 Central has been given some subordinates called Control Buffers. Once told what to do, the underlings go about their work of reading cards or tape, looking up data, printing findings. If Central is too busy with more important work to listen to the answers, it "confers" with the subordinates at a more convenient time. Bendix says it gets around a common human failing—refusal to delegate authority.

GE Offers Technicians for Hire; Do Custom Measuring

Today's demands for precise measurements have brought about a new industrial service from General Electric Co. The firm will send skilled technicians with precision instruments to your plant (on a per diem basis) to measure

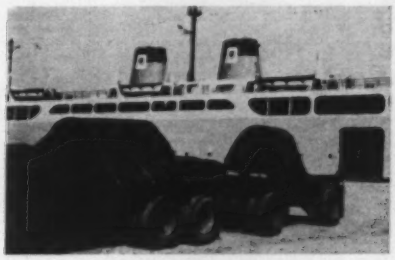
virtually any electrical or physical quantity—including voltage, current, frequency, phase relation, force, pressure, torque, temperature, displacement, vibration, strain, surface roughness, or profile.

Labor-Management Summit Conferees Named

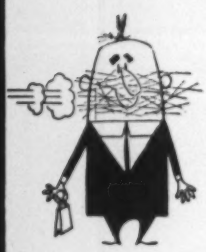
George Meany (president, AFL-CIO) named himself, Walter Reuther (United Autoworkers chief), and George Harrison (Railway Clerks head) as the three-man team to meet with industry representatives soon to plan a series of conferences on basic labor-management problems. The National Association of Manufacturers will name the management team.

Year-Around Fishyback Service Started

Daily, year - around, fishyback service between Detroit and Cleveland was started May 6 by the *Jack Dalton*. Shipments are loaded on demountable trailer bodies and stowed aboard. The operation will cut shipping costs by 7.5 to 15 per cent, says Detroit Atlantic Navigation Corp.



Straws in the Wind



U. S. industry suffered 720 work stoppages (involving 220,000 workers) during the first quarter of 1960 vs. 728 stoppages (253,000 workers) in the like '59 period, the Labor Department reports . . . The average salesman of metal products drove his car 2103 miles per month on company business during 1960's first four months (vs. an average 2024 in the like '59 period), says Wheels Inc., Chicago . . . Industrial investment projects in Metropolitan Chicago during 1960's first four months total $85.6 million—vs. $63 million in the like '59 period . . . The bonded and coated abrasives industry produced a record $289.8 million worth of products in 1959, the Commerce Department reports.

Metalworking Pulse

The Business Trend: Three of the four components of STEEL's industrial production index are strengthening, overcoming the decline in steel operations. Result: The trend line has held steady for three weeks. **Autos:** Production is moving up again in response to greater consumer demand. April new car sales set a 54 month high. **Steel:** At the current rate, output for ingots and castings is about 500,000 tons a week below year-ago figures.

- **INDUSTRIAL PRODUCTION**
  - Week ended May 7 ..... 164†
  - Year ago 169
  - Details on Page 71
- **PASSENGER CAR PRODUCTION**
  - Week ended May 14 . 144,000*
  - Year ago 135,856
  - Details on Page 68
- **INGOT PRODUCTION RATE**
  - Week ended May 15 .. 73.8%†
  - Week ago 75.0%
  - Details on Page 142

†Preliminary. *Estimated.

What Odds for Machine Tool Standards?

"A TIME to keep silence, and a time to speak." (Ecclesiastes iii, 7)
Machine tool builders chose silence rather than comment on a system of general purpose machine standards introduced by a group of influential customers, largely the automotive and farm equipment makers.
The user representatives made their pitch at the spring meeting of the National Machine Tool Builders' Association in New York. They said they were determined to make the standards (on milling, turning, drilling, and grinding machines) work, but that it would be easier and more effective if the builders would help.
For several hours the builders sat, listened, looked at slides, and made notes. When the chairman asked for questions from the audience, there were none. When someone asked for comments, there were none. This, despite the fact that plenty of builders present had the stature and authority to speak for their companies.

● **What are the odds for machine tool standardization?**
The user group wants to arrive at machine standards that will help eliminate some costly tooling duplication. That's good. In doing so, it wants to arrive at a set of descriptions that will be suitable to all users and become the machine tool industry's standards as well. That is probably impossible.
One builder explained it to STEEL this way: "The aircraft industry already has arrived at some ideas for its own standards. Its ideas and the ideas of this newer group won't coincide exactly, so we would be faced with the problem of building to two standards, depending on the customer. More important than that, many of the machines we now sell to the aircraft industry are not in accord with the standards it set. There's a good reason for that, and the reason will continue to apply in many machine tool sales: Our equipment almost never becomes an off-the-shelf line. We sell machines on the basis of their ability to solve a customer's specific need. If the machine has to depart from standard to do that, the standard is dropped in a hurry."

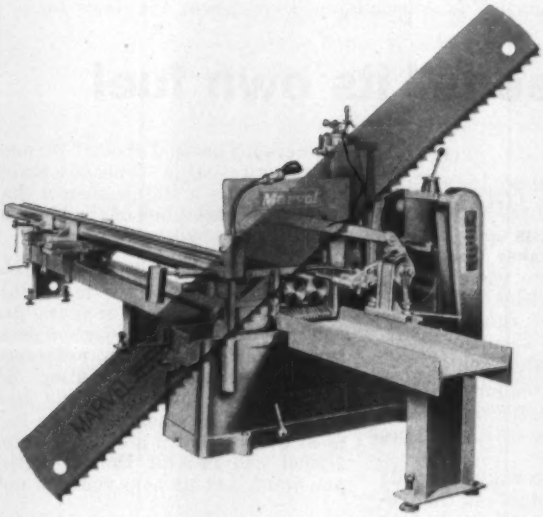
● **But some standardization will result.**
The users are looking for: "The unification of industry standards, covering such areas as tool attaching surfaces and fixture attaching surfaces." This, they feel, would permit the interchange of tooling and fixturing, which would save both time and money.
Many builders admit that some of the ideas are understandable and proper. It is reasonable, for example, that on milling machines of similar capacity, the location and size of T-slots on the table should be the same, no matter who made the machine. Also, minimum table travel standard on machines of equal capacity may be desirable.
On some others, like spindle taper on a drilling machine, or a standard width of ways on some turret lathes, builders say agreement will be much more difficult, if not impossible.

● **Will the builders fight the standards?**
Not likely. "Look at that list of companies proposing the system. Those make up our bread and butter. We will certainly not fight them. They will decide what they want us to build for them, and we will build it. We'll have to. But we also have other customers with other problems and with a need for other solutions. We must suit them too."

a message to owners of

MARVEL HACK SAW MACHINES

If you are the owner of a MARVEL Hack Saw Machine, check the name on the blades being used in it. If they are not MARVEL Blades, the chances are very good that you are not getting all the cutting-off speed, accuracy, and economy you paid for when you bought a MARVEL Saw. Consider this fact. The hack saw *blade* is the cutting tool that actually does the cutting job. If the machine is expected to deliver its full efficiency, the blade must possess a ruggedness comparable to that of the machine. Isn't it logical, then, that the blades you use be as carefully selected as the machine itself? Here is another fact: The MARVEL High-Speed-Edge Hack Saw Blade was designed specifically to withstand the heavy feed pressures and high cutting speeds your MARVEL Hack Saw can deliver. Only MARVEL UNBREAKABLE Hack Saw Blades can be safely tensioned taut enough to provide the maximum rigidity of the cutting tool necessary for accurate cutting-off; and at the same time, protect both the operator from injury and the machine from damage that so frequently occurs with "breakable" blades.

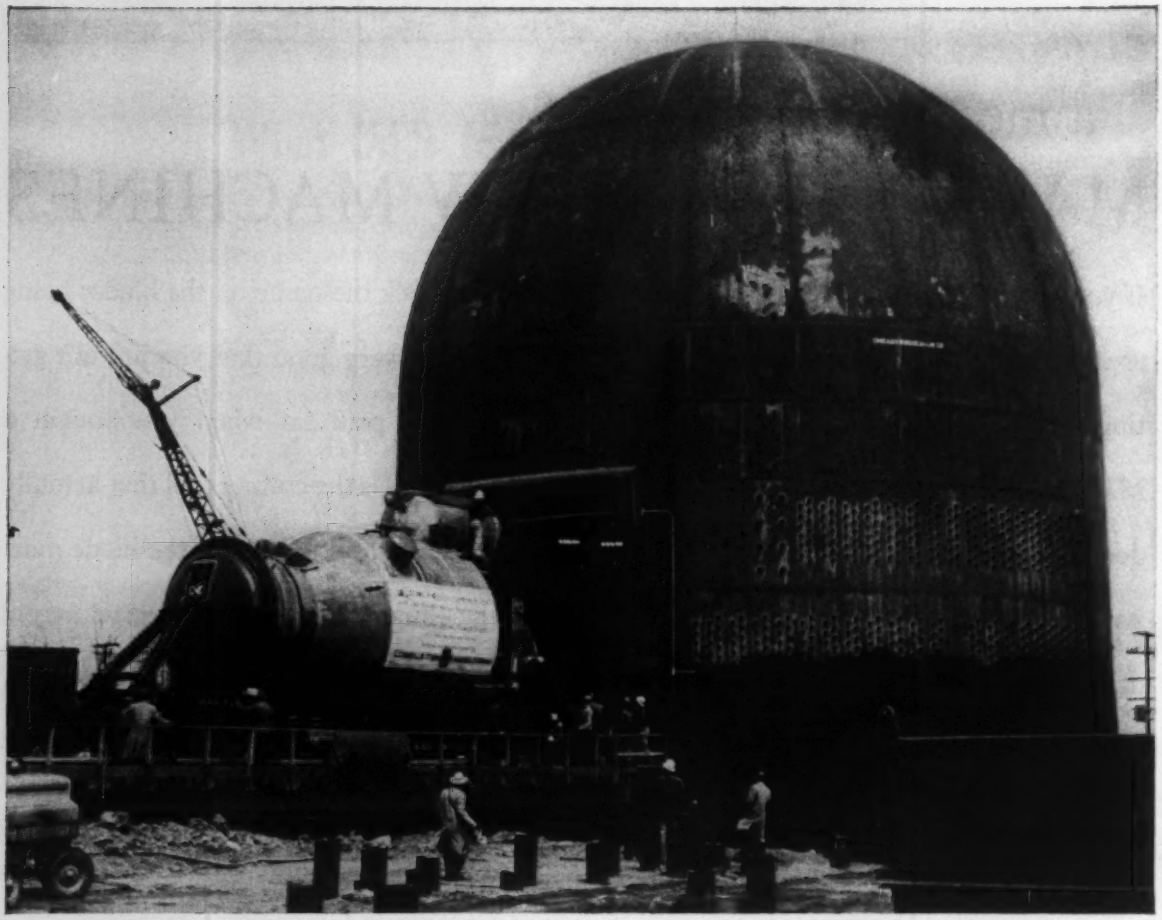


Why not be certain your MARVEL saw is delivering the high performance you had originally purchased, by using the only blade capable of utilizing the power and accuracy built into the machine? MARVEL Hack Saw Machines and MARVEL High-Speed-Edge Blades are an unbeatable combination. MARVEL High-Speed-Edge Hack Saw Blades are stocked and sold by leading Industrial Distributors everywhere.

MMT-PE

ARMSTRONG-BLUM MFG. CO.
5700 Bloomingdale Avenue • Chicago, Illinois

MARVEL Metal Cutting SAWS
Better Machines-Better Blades



Atoms for Peace. This dome houses the 91-ton reactor vessel made of nickel-containing stainless steel for the new Enrico Fermi Atomic Power Plant on the shore of Lake Erie near Monroe, Michigan. Detail design and construction of the reactor vessel was done by Combustion Engineering, Inc. Plant will be built and operated by Power Reactor Development Company from designs supplied by Atomic Power Development Associates, Inc.

Atomic reactor "breeds" its own fuel

Stainless steel vessel must withstand high temperatures and corrosives

The world's largest full-scale nuclear reactor of the "fast-breeder" type is now being built. It may well answer the question:

> *When will atomic power be competitive with conventional methods of producing electric power?*

As the term "fast-breeder" indicates, the atom-splitting process is maintained by so-called *fast* or high-energy particles. It produces more nuclear fuel than it consumes. The fast-breeder actually turns out a kilogram and a fifth of new fuel for each kilogram it burns up!

The "breeding" takes place in a 36-foot high pressure vessel. Here, the high-energy particles (neutrons) travel at speeds of thousands of miles per second to keep the atom-splitting chain reaction going.

Accent on safety. A major objective was to make this reactor vessel safe. That called for a lot of highly specialized work.

It also called for a rugged metal: one capable of withstanding the tremendous heat given off in nuclear fission, and of bearing up under the temperatures and corrosives encountered. The final choice? Strong, corrosion-resisting Type 304 stainless steel. It's a stainless steel that contains Nickel – one of the big reasons for these superior properties.

How to "fast-breed" ideas. Problems involving reactor materials may never be a concern of yours. But you can run into *metal selection problems* involving corrosion, pressures, high temperatures and other destructive conditions almost any time. When you do, remember there is a good chance that a steel containing Nickel will provide the properties you want. Let us help you find out.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Your Stake in Defense

Don't think that the U. S. has gone soft anywhere along the line in dealing with the Soviet Union.

Our government intends to remain tough and independent, and the metalworking industry will have an even bigger stake than it has in the past in keeping it that way.

It is a stake you should know more about.

Man's concept of war has been completely revolutionized. (We witnessed a demonstration of the new look in military technology at Ft. Benning, Ga., a few days ago.)

For example: As recently as the Korean armistice seven years ago, we had one thousand 75, 90, and 120 mm antiaircraft guns ringing our North American air defense system.

By July 4, 1960, not one of these 1000 guns will be operational, Lt. Gen. Arthur G. Trudeau, Army chief of research and development, said at Ft. Benning.

They have been replaced by Nike Ajax missiles designed for defense against incoming bombers.

But technology is moving so fast that the Ajax provides no defense against thermonuclear intercontinental ballistic missiles.

So the Ajax is being phased out in favor of the more versatile Nike Zeus that can knock down the ICBMs.

But even if the next war starts with an exchange of ICBMs, the final decisions will be rendered by land forces.

They are being equipped for vastly improved mobility, firepower, and communications. New land, water, and air vehicles can move men, guns, missiles, and supplies quickly to forward positions or behind enemy lines.

New weapons ranging from the new M-1 rifle to the portable Davy Crockett nuclear gun provide fantastically improved firepower.

New electronic communication and fire control systems are microminiaturized. Some 350,000 elements are packed in a square foot of space. Previously, the limit was 7000.

Supplying such military hardware requires the services of big, medium, and small companies. Thirteen hundred companies, for instance, shared in the production of the Nike Ajax.

You owe it to yourself and your country to determine your stake in defense.

Irwin H. Such
EDITOR-IN-CHIEF

A GUARANTEED ROOF OVER YOUR HEAD

New...and only with Butler... full 20-year roof protection for pre-engineered buildings

Here's another reason to "go Butler" for your new building this year. You can have a preferred aluminum roof of such job-tested superiority that we are now able to offer a *20-year guarantee.*

This is the first and only long-term roof guarantee for pre-engineered buildings. It is made possible by Butler's leadership in designing and fabricating an enduring, weatherproof aluminum roof system that today has an impressive history of outstanding performance on thousands of Butler Buildings. Be sure that this new development in roof security, optional at nominal extra cost, is considered in your building plans.

Your Lowest-Cost Way to Build Well—superior roof protection is one of many reasons why more offices, plants, stores, warehouses, terminals, recreation centers, schools and churches every year are being built with the Butler Building System.

For your new building, take advantage of the wide, clear spans of Butler rigid frames . . . the beautiful new Butler-Tone™ baked-on color finishes for wall and roof panels . . . your choice of the finest factory-insulated or field-insulated exterior wall panels . . . the fast, trouble-free construction . . . and the dependable, talented services of your local Butler Builder.

Interested? See the Yellow Pages for the name of your Butler Builder, under "Buildings" or "Steel Buildings." Ask about financing, too . . . or write direct.

See Sweet's Industrial Construction File—Section 8-B

MBMA

BUTLER

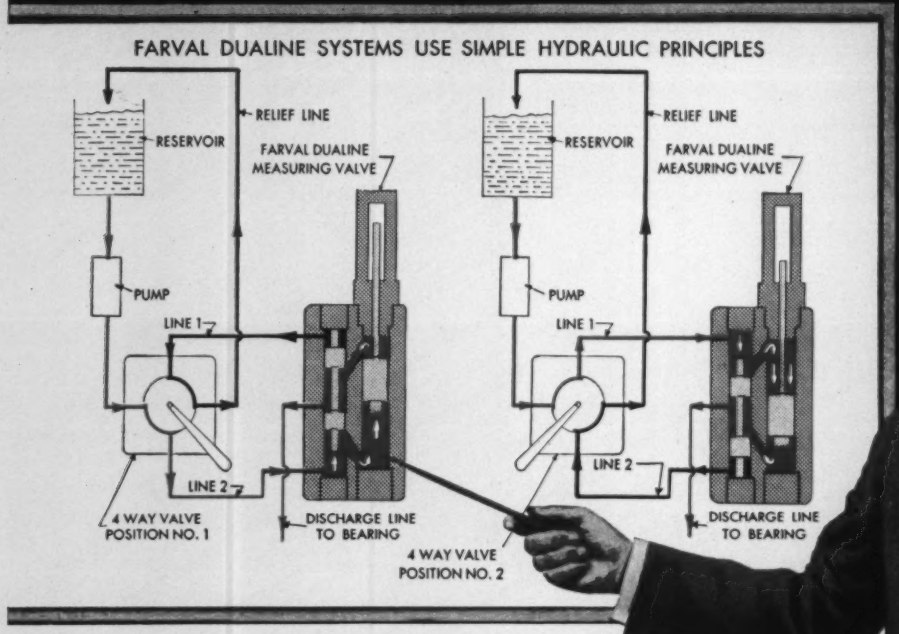
BUTLER MANUFACTURING COMPANY
7377 East 13th Street, Kansas City 26, Missouri

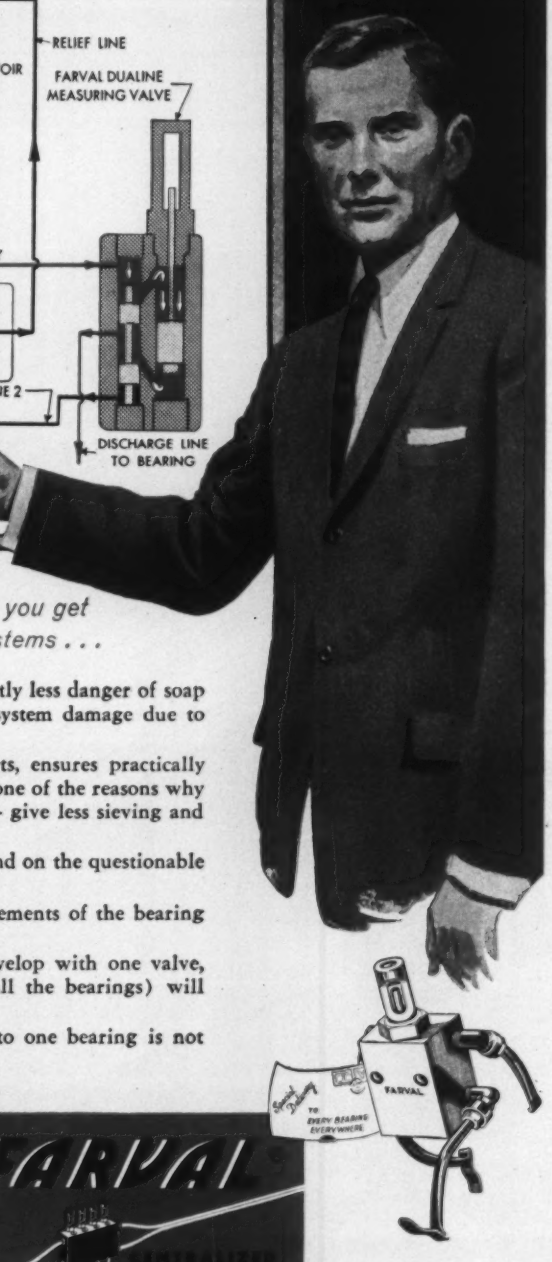
Manufacturers of Metal Buildings • Equipment for Farming, Oil Transportation, Outdoor Advertising • Contract Manufacturing

Sales offices in Los Angeles and Richmond, Calif. • Houston, Tex. • Birmingham, Ala. • Kansas City, Mo. Minneapolis, Minn. • Chicago, Ill. • Detroit, Mich. • Cleveland, Ohio • Pittsburgh, Pa. • New York City and Syracuse, N.Y. Boston, Mass. • Washington, D. C. • Burlington, Ontario, Canada

FARVAL
—Studies in Centralized Lubrication
No. 246

"For positive lubrication of large, medium and heavy-duty installations . . . it's a Farval Dualine System!"





With Farval Dualine centralized lubricating systems you get the following distinct advantages over other type systems . . .

(a) Much lower operating pressures with consequently less danger of soap separation on grease systems. Also, less danger of system damage due to high lubricant pressures.

(b) Large lubricant passages with no pinhole ports, ensures practically full pump pressure for every metering valve. This is one of the reasons why Farval Dualine systems operate on lower pressures — give less sieving and working of lubricants.

(c) Positive indication at each bearing — does not have to depend on the questionable action of a single indicator at the pump.

(d) Each metering valve individually adjustable for the requirements of the bearing it serves.

(e) Independent metering valve operation. Should trouble develop with one valve, the system will continue to operate. Only one bearing (not all the bearings) will require hand lubrication until trouble is corrected.

(f) True lubricant metering. Quantity of lubricant delivered to one bearing is not dependent on any other valve in the system.

(g) Much easier to spot and correct trouble.

Check with your Farval Representative and see how these versatile systems can improve production operations — reduce costs. Or write for free Bulletin 26-T containing complete engineering information on Farval Dualine systems.

Farval Division
Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio

In the Chicago-Midwest area, STEEL's flying editors found . . .

- Sales are above year-ago levels; businessmen are optimistic; some predict record years.
- Prices have not firmed as much as managers believe they should. In most lines, price competition is fierce.
- The majority of companies face serious profit problems; earnings aren't climbing as fast as sales volume.
- The big emphasis is on aggressive marketing—expanding sales forces, new catalogs, bigger advertising and sales promotion budgets, more market research, new sales aids.

Midwest Pushes for Record Sales

"BUSINESS IS DAMNED GOOD."

That assertion by E. A. Channer, vice president, H. M. Harper Co., Chicago, typifies the bullish attitude of metalworking executives in the Chicago-Midwest area. And their companies are operating at levels high enough to justify such a statement.

There are some weak spots: Most capital goods makers reveal order volumes just slightly above the year-ago levels; farm implement makers had a relatively slow first quarter; and a few companies display a cautious brand of optimism.

But most Midwestern firms checked by STEEL are operating at a near-boom pace—and most are pushing for record sales volumes this year.

• **Aggressive Selling**—STEEL's editors were impressed by the hard-hitting marketing plans of the region's metalworkers. They're expanding their sales forces, developing new—and effective—sales aids, boosting advertising and sales promotion budgets, preparing new catalogs, establishing new incentive programs for salesmen, raising quotas, encouraging salesmen to make more

CHICAGO—George Spatta (right), president, Clark Equipment Co. tells News Editor Bill Dean: "We're studying the potential of importing components made in our overseas plants to use in our domestically built products"

ST. LOUIS—Edward L. O'Neill, vice president-general manager, Emerson Electric Mfg. Co., tells Associate Editor George Howick: "The first quarter of 1960 was by far the best in our company's history"

calls per day, spending more money for market research.

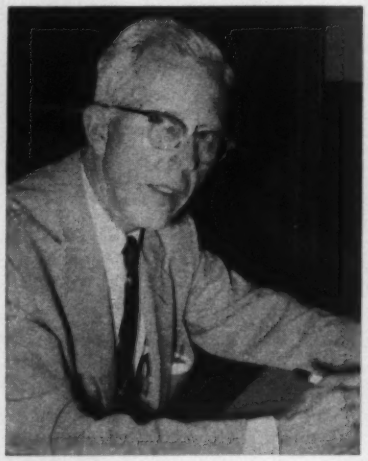
• **Price Predicament**—Most manufacturers report considerable difficulty in trying to push through any kind of price increases. Instead, many are forced to trim quotations to meet severe price competition—from both domestic and foreign firms. A few executives say prices are beginning to firm, but most believe the softness will continue throughout the year. G. H. Woodland, vice president-sales, Chain Belt Co., reports his firm is in its third year without a price increase. Officials of Ampco Metal Inc. note "plenty of pressure on prices." R. J. Ryan, president, Nooter Corp., says: Price levels for plate fabricating have improved in the last six months —but not enough. Prices are only slightly above the 1957 level—while our labor costs have risen 15 per cent, and other costs have climbed.

• **Delivery Pressure**—Midwest managers say rush orders are becoming the rule rather than the exception. Getting an order often hinges on the ability to beat competitors' delivery by a few days, they say. Many look upon this as an encouraging sign.

They believe metalworking is learning its inventory lesson. They think that inventories will be controlled enough to keep us from having a severe recession if another sales dip comes along.

MILWAUKEE—Jack S. Morgan, director of domestic sales—Industries Group, Allis-Chalmers Mfg. Co.: "Utility and steel industry construction programs are boosting our backlogs"

MILWAUKEE—J. P. Henry (left), vice president, and J. D. Zaiser, president, Ampco Metal Inc.: "Delivery pressures are getting intense. You deliver in two or three weeks or you lose the sale"



MILWAUKEE—Walter Schneider, vice president, Falk Corp.: "We're concerned about wage and benefit costs. Sooner or later they find their way into prices"

CHICAGO—E. A. Channer, vice president, H. M. Harper Co.: "I think the economy will persist at this level for the remainder of the year"

• **Product Countdown**—Here's an industry-by-industry report on STEEL's findings in the Chicago-Midwest area:

• **Appliances**—Most appliance makers and their suppliers look for good summer sales—after an encouraging first quarter. Exception: Laundry equipment and water heater sales got off to a slow start, but late March brought an upturn that carried into April. Companies expect continued improvement. Edward L. O'Neill, vice president-general sales manager, Emerson Electric Mfg. Co., says April sales were "quite a bit better" than those of March. He expects May volume to be "strong." He reports that the industry's sales peak is coming a little earlier than usual this year. Several manufacturers report rugged price fighting at the dealer level, which is putting pressure on the producers' prices. Stewart-Warner Corp. reports that its March sales of heating and air conditioning equipment were 42 per cent above those for March, 1959.

• **Capital Goods**—Nearly all producers of capital goods in the area report their dollar sales are 5 to 15 per cent above year-ago levels. And the majority are experiencing a spring upturn in incoming orders.

George Spatta, president, Clark Equipment Co., told STEEL: April was our best sales month for lift trucks . . . construction equipment bookings rose in April . . . trailer sales have tripled in the last three years.

L. R. Rothenberger, vice president-sales, DoAll Co., reports: March new orders for our perishable tools and gages set a record . . . export sales are up . . . we've expanded our sales force and our men are making more calls per day . . . we expect a 10 per cent increase in machine tool orders in the second half.

R. O. Schiebel, vice president-sales and marketing, Magnaflux Corp., says: First quarter orders jumped 50 per cent above the 1959 first period level—and April sales were better than those of March . . . many current orders are the result of considerable engineering work.

W. H. Oswald, general sales manager, Alvey Conveyor Mfg. Co., told STEEL: April orders rose 250 per cent above the March level—and it was not due to a few freakish, big, orders but rather the closing of many orders . . . our first quarter sales were 21 per cent

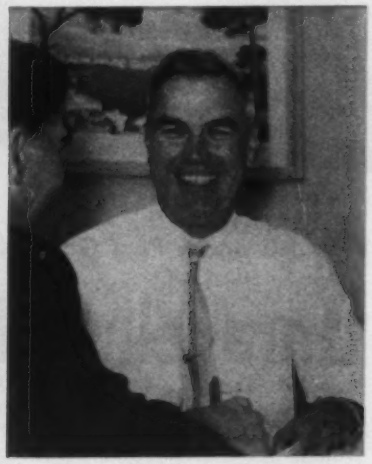
MILWAUKEE—George Woodland, vice president, Chain Belt Co.: "Our sales are running 3 per cent ahead of 1959's —a record year. We don't see any sharp changes for nine months"

INDIANAPOLIS—R. S. Wood, general manager, Link-Belt Co. bearing plant: "Customer inventory trimming is about over. We look for second half sales to be 10 per cent above the first half"

DEPLANING, AMERICAN AIRLINES, FLIGHT #537—Donald A. Campbell (right) vice president, Ducros Co., Cleveland, reports: "We expect a 40 per cent increase in small container sales"

CHICAGO—R. O. Schiebel (center) vice president, F. S. Catlin (r), manager marketing development Magnaflux Corp: "Missile market shows promise"

DES PLAINES, ILL.—L. R. Rothenberger, vice president, DoAll Co.: "We're selling harder and putting more emphasis on new products"



ST. LOUIS—Nooter Corp.'s President R. J. Ryan reports: "We expect our sales volume in the fourth quarter to be our highest quarter since 1957"

above those in 1959's first quarter . . . we expect our total 1960 volume to be at least 20 per cent above that of 1959.

John E. Renner, general sales manager, Lincoln Engineering Co., a division of McNeil Machine & Eng. Co., reports: April orders rose 4 per cent above the March level, and our first quarter sales were 10 per cent above those of a year earlier.

Jack S. Morgan, director of domestic sales, Industries Group, Allis-Chalmers Mfg. Co., says: Replacement sales are strong . . . price competition is fierce in electrical equipment . . . bookings are 15 per cent above year-ago levels.

R. S. Ingersoll, president, Borg-Warner Corp., reports a mixed trend in industrial product orders . . . improvement in several lines . . . a decline in others.

● **Components & Materials**—Record or near-record sales seem in prospect for most Midwestern component makers, but profits will be hampered by price competition, rush orders, and rising costs. Here are typical forecasts:

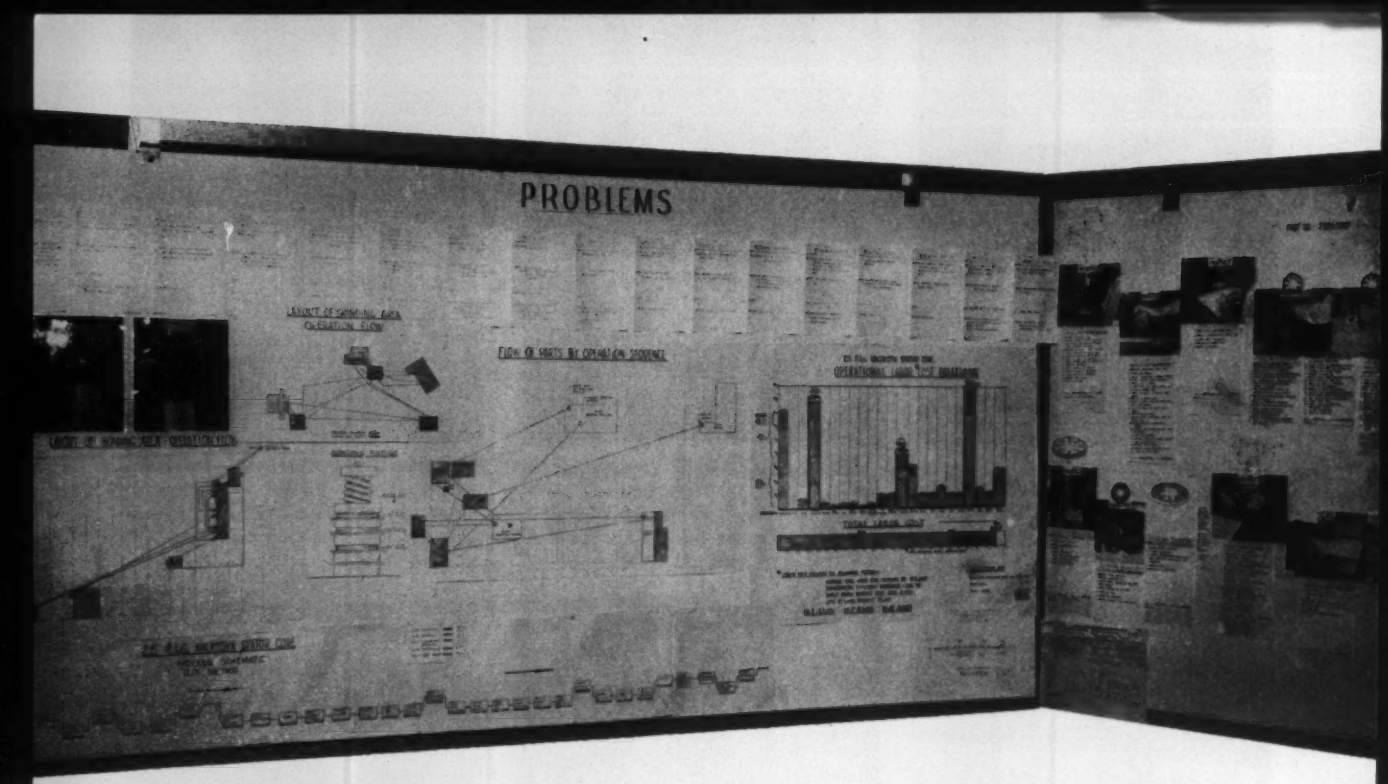
Walter Schneider, vice president-sales, Falk Corp.: Sales are running 10 per cent above 1959 levels . . . our second half should match the first.

E. G. Holtzman, secretary-treasurer, Wagner Electric Corp.: April sales exceeded those of March . . . sales are currently running at a record level.

Jack R. Glatthaar, assistant director of sales, Inorganic Div., Monsanto Chemical Co.: We expect to stay on a high sales plateau for the balance of the year . . . the outlook is good for the aluminum anodizing and bright dipping market where we have a new product that cuts costs and permits better control over the nitric acid content of the bath.

Bill Heilig, vice president-sales, Wm. Powell Co.: Inquiries have been increasing ever since the first of the year, but many have not reached the order stage. The second quarter looks better than the first.

STEEL's air safari editors check the business pulse of the Western states next week.



How AC Spark Plug Goes About . . .

Unraveling Production Snarls

GENERAL MOTORS has come up with a new concept of production planning that's designed to cut through the maze of modern manufacturing.

GM has its sights set on problems like these: Communications among staffs involved in fabricating a complicated piece of equipment often break down; co-ordination of multiple manufacturing operations is difficult; effort is duplicated; process specifications pile up; and memos fly from department to department with increasing confusion.

The concept (called the Production Engineering Team Approach) is in operation at AC Spark Plug Div. plants in Milwaukee.

• The technique has been used to plan new operations and to correct flaws in current operations.

When AC Spark Plug developed its ACilloscope, an electronic instrument for observing the performance of vehicle sparkplugs, it turned to its team to devise production facilities. A production plan was formulated in 12 days.

Current project: A continuing analysis of the complex manufacturing operations for gyros used in missile guidance systems.

• Teams are formed by a tool engineer, process engineer, and a methods engineer.

Each man is a specialist. As a unit, they bring together the combined knowledge and problems of all manufacturing phases.

A standard procedure has been developed to guide the team in its work.

• First step is to define the scope and objective of the project.

That is a job for management—it works with the team co-ordinator to set the goal. The real work of the team begins with a study of the manufacturing system. Members are assigned to observe, record, and analyze on-the-floor conditions to determine problems. Many of the problems can be expanded to include other departmental personnel. They assist in putting together the information package.

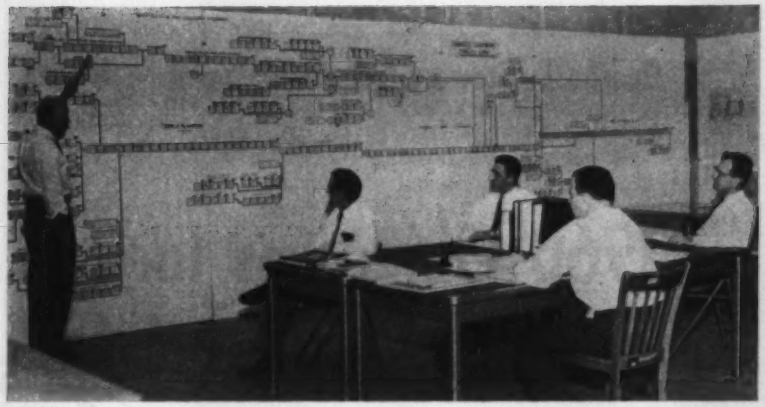
After the problems are designated, the team moves into step three—planning possible solutions. Again, the team takes on more people to help attack each problem individually and as it relates to the over-all system. Support from other departments is important at this point.

With possible solutions in hand, evaluation begins. Members must decide on the best solution in terms of reliability, quality, economics, and other intangibles.

Proposals for action are made to management. Installations of approved proposals are assigned to personnel involved in the applicable work area. A check on results provides management with a means for measuring the effect on original objectives.

• Communication of conditions, problems, and solutions is all important in the approach.

AC Spark Plug does it with planning boards. Each step of the procedure is completely diagramed in layouts, charts, and other visual devices. The boards are placed on



A production engineering team reviews operations on a planning board. These teams consist of specialists in tool, process, and methods engineering. Their combined talents have assured many improvements

the walls of the planning room for the benefit of all personnel concerned.

One group of boards contains a schematic of each step in the manufacturing system, including quality control points, plus photographs and descriptions of what takes place, when, and how.

Other boards contain analyses of product design and the tooling in use. Others analyze costs of direct and indirect labor, scrap and rework losses. The results of the team's efforts—the problems, causes, proposed solutions, and action being taken—are displayed, giving a visual communication which has proved to be much more effective than typed memos and phone calls.

"Use of the planning boards provides a means for setting up new production systems by moving paper around before production begins, instead of moving personnel or machinery afterward," observes Malcolm Stamper, chief engineer, Manufacturing Development, who is planning team co-ordinator for the GM division.

Possible malfunctions of a process are spotted and corrected often before they become entrenched in the manufacturing process.

The team is also responsible to see that easily read and well illustrated process descriptions are written on each operation for use by production operators. Motion pictures of complex manual operations are taken by the methods engineer for analysis purposes and are later used for training new operators.

• In organizing a Production Engineering Team, the choice of members is highly important to the program's success.

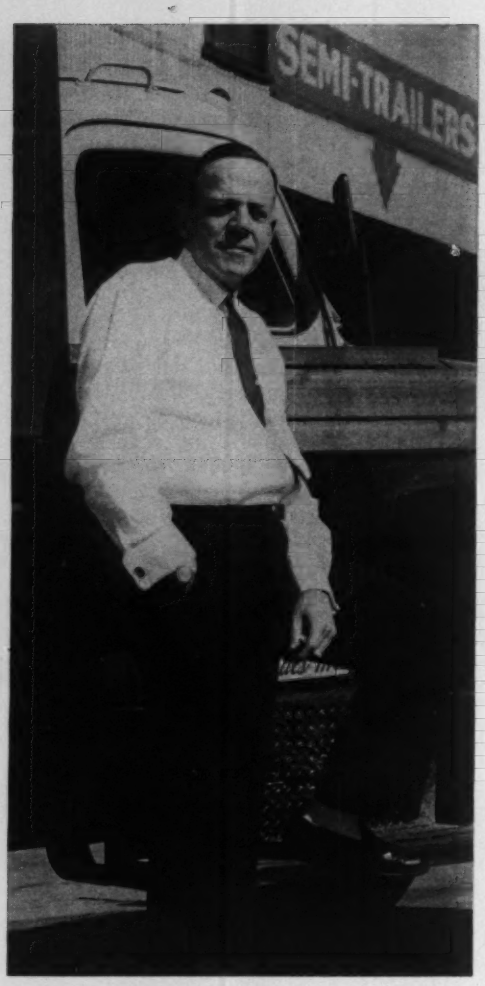
Fred Bigsby, director of methods engineering for AC Spark Plug, describes the ideal team member:

"He must approach his task with a willingness to judge new ideas on their merit, not in relation to past practices. He must be humble about his knowledge. He must have an analytical mind, be thorough in his work, and have a high mechanical aptitude."

To that, Mr. Stamper adds: "Personality is highly important. He has to meet and talk to persons at all levels in the plant. He has to gather information on all phases of the manufacturing system and he has to be able to present this information to management. He must be profit minded and have a feel for costs."

AC Spark Plug management is enthusiastic about the results of the approach. Properly executed and with the full co-operation of those involved, it becomes a valuable management tool.

OFFSHORE OIL WELL DRILLING BARGE delivered this month from the builder, Avondale Marine Ways Inc., New Orleans, is for use at 100 ft depths in the Gulf of Mexico. The barge, 217 ft x 117 ft x 14 ft, is shown the way it will look when ready for drilling. Under water, a pontoon 184 ft x 117 ft x 8 ft, serves as a base. The barge and pontoon are connected by four legs 180 ft high and 12 ft in diameter and made of 2 in. steel plates. The pontoon is jacked down to the gulf floor. Four telescopic spuds are then driven as anchors into this floor, and hydraulic jacks raise the barge on the four main columns. Another column provides access down into the pontoon. Air conditioned living quarters are provided for 44 people. A helicopter deck is included. Barge Facilities Inc., San Francisco, is the owner, and the California Co., New Orleans, is the lessee



George L. Stewart, president, Steel Service Center Institute, outlines . . .

1960 Objectives for Service Center Managers

- Provide leadership for metalworking industry in fight on inflation.
- Help metalworking executives resist the profit squeezing pressures.
- Seek constructive solution to the growing import problem.
- Keep long range goals in sight; don't sacrifice the industry's good name for temporary gains.
- Sell more than steel—sell the cost-saving advantages of service center function.

Distributors Step Up Modernization

FUNCTIONAL changes in the distribution of steel and other metals are transforming the traditional warehouse from a commonplace storage and merchandising activity into a complex industrial facility. By modernizing the supplier function to include extensive fabricating and processing services, the distributors are enhancing their usefulness to the rapidly expanding metalworking industries.

The accelerated pace of modernization in this service industry, which dates from colonial times, is providing the theme for the fifty-first annual meeting of the Steel Service Center Institute (formerly the American Steel Warehouse Association) being held in Miami Beach, Fla., this week.

Even the new name of the organization injects a modern note. It's more descriptive of the distributors' functioning in today's economy; the term, steel service center operator, more aptly applies to industry members. Such terms as steel jobber, steel merchant, steel warehouseman, and steel broker, by which they formerly were described, were narrow and often misleading.

• The modern approach to today's business problems is evidenced in convention speeches and discussions.

They cover: Customer relationships, market research, technical development, metallurgical and technical assistance to customers, selling techniques and policies, business ethics in our increasingly competitive economy, imports, labor relations, and the impact of technological, scientific, political, and social innovations (including the threat from communism) on the economy in general, and on distribution of steel and other metals in particular.

An Idea Fair spotlights such things as safety developments, record keeping systems, sales promotion gimmicks, advertising programs, new truck designs, and better handling equipment. The display is aimed at helping the distributor improve his operating efficiency,

increase his sales, cut his costs, and establish better customer relationships. The ideas advanced are expected to assist the industry in adjusting to technological and merchandising changes attending the transition of the general economy into an era of plentiful metals.

Steel producing capacity (148.5 million net tons annually) now exceeds normal consuming requirements. That's bringing changes in procurement practices that are highly significant for the steel distributing industry. Assured of adequate supplies, except under the most unusual conditions, buyers are not stockpiling steel as heavily as formerly, holding their purchases more closely to immediate needs. That was reflected in lower-than-expected steelmaking operations this spring.

• More steel tonnage probably will be diverted to the service centers, as the mills can't economically handle small lot orders, and can't give the spot deliveries being more frequently demanded.

George L. Stewart, president of the institute (see cover), and president, Jones & Laughlin Steel Warehouse Div., says the changes in steel procurement open a great opportunity for the service centers to demonstrate their cost-saving services. He points out the actual cost of steel in a manufacturer's inventory often runs 15 to 40 per cent more than his invoice for the material indicates.

Hidden costs include such charges as maintaining inventories over long periods, losses resulting from obsolete sizes and shapes, and preliminary cutting-to-size operations. By making regular use of the service centers, he says, manufacturers can release capital for other purposes, utilize floor space more advantageously, dispense with extensive, often idle, equipment, and use manpower effectively in more productive jobs.

He warns, however, that if the service centers are to carry a larger share of consumers' inventories than ever before, they'll have to stock a complete range of product sizes and shapes at all times, and in quantities adequate to promptly meet the enlarged demands of discerning buyers. Shipment promises must be kept on time. Also, broader processing services than ever before must be made available.

• The service centers, taking a cue from basic steel, are building new plants, modernizing old ones, and broadening their services generally.

That means, says Bob Welch, executive vice president of the institute, that, just as the steelmakers switched production emphasis from the heavy products (for capital goods) to the lighter items (for consumer goods), greatly minimizing swings in steel production, the service centers are now stressing the multiple processing services they offer customers.

They include coil slitting, sheet leveling, edging, and coating; plate burning and grinding; structural shape and bar sawing, shearing, and cutting. Some centers maintain painting and other protective coating lines. A few are equipped with temper mills.

There are about 3000 distributors. Half of them handle merchant products (nails, wire, corrugated roofing, standard pipe). A few specialize in oil country goods, while the remainder, about 1200 plants spread over the country, handle industrial steel products (plates, structurals, rods and bars, sheets and strip, tubing, stainless and alloy products, and similar items).

The Steel Service Center Institute, with 500 members operating 900 plants, concentrates on problems involving the industrial products. The service centers are suppliers to 500,000 steel users, though, surprisingly, 75 per cent of their shipments go to 40,000 consumers who buy some or most of their requirements directly from the mills.

• Many distributors include nonferrous products, particularly aluminum, in their inventories, and some are adding the refractory and other exotic metals for Space Age applications.

Last year, more than 13 million net tons of finished steel were shipped by the mills to the distributing industry. That accounted for about 19 per cent of total mill tonnage, ranking second to the automotive mill take. Distributors of the industrial steel products moved more than 9.8 million tons through their plants during the year, the total being made up of 7.2 million received from the mills, imports of 600,000 tons, and about 2 million tons from inventory.

Stocks of industrial steel products in service centers have recovered markedly from the drain of last year's steel strike. Currently, the distributors estimate they are holding well balanced inventories totaling about 3.5 million net tons. That contrasts with 1.1 million at the start of the year. Inventories have ranged up to 3.7 million tons, that being the total held last July, just before the steel strike.

Steel Service Center Inventories
(Net tons)

At start of:	Tons
1955	3,000,000
1956	2,650,000
1957	2,930,000
1958	3,727,000
1959	3,377,000
1960	1,150,000
May, 1960	3,500,000

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Industrial Construction Hits Uptrend in April

Spending for industrial construction in April was 38 per cent above the pace in the same month last year. The figure for commercial construction was up 9 per cent, reports the Commerce Department.

In terms of a seasonally adjusted annual rate, the value of all construction in April came to $52.4 billion, about 2 per cent below the March rate.

• Private—New private construction expenditures in April reached $2.9 billion, 4 per cent above the March level but 5 per cent under the April, 1959, figure. Spending for private residential buildings amounted to $1.5 billion, 5 per cent above the previous month's rate.

• Public — Public construction spending in April mounted 20 per cent above the March level, to $1.2 billion. April spending for most public construction categories was lower than in April, 1959, accounting for a decline of about 10 per cent in total public construction.

More Defense Dollars for Metalworking... Mitchell Pushes For Labor Legislation... Robot Merchant Ship Study OK'd

● MORE DEFENSE ORDERS — **Changes by the House in President Eisenhower's defense budget will work in metalworking's favor.**

The Senate seems certain to go along with most of the House recommendations. Over-all, the defense budget has been increased a scant $122 million since it was introduced in January by the President, but several of the item changes will benefit metalworking (see table below).

Some of the cuts will work for increased efficiency of the Pentagon, say House Appropriations Committee members. So, if properly carried through, business may look for less waste and red tape in procurement.

● EXECUTIVE RESERVISTS—**Members of the National Defense Executive Reserve will be briefed in Washington by the Office of Civil & Defense Mobilization, May 23-24.**

About 2500 reservists are enrolled in the program. Top government leaders will speak on the theme, "Preparedness on the Home Front." More than 1300 members of the program are drawn from industry.

William A. White Sr., BDSA director, announced "broadened roles" for reservists in the emergency post-attack setup. Certain men with previous experience in government will be immediately designated for key roles on a standby, confidential basis.

● EXTRA CONGRESSIONAL SESSION?—**Possibility of a Congressional session after the national conventions grows as more administration leaders speak out on needed legislation.**

Labor Secretary James P. Mitchell is asking for: 1. Increased coverage by the federal minimum wage. 2. A "moderate" increase in the minimum wage above its present floor of $1 per hour. 3. "Sound" proposals for aid to U. S. areas where unemployment is substantial. 4. An extension of the federal unemployment insurance program. 5. Increased power to administer the Welfare & Pension Plan Disclosure Act.

● AUTOMATED MERCHANT SHIP—**The Maritime Administration has awarded a study contract to Norden Div., Stamford, Conn., United Aircraft Corp., which is expected to lead to the construction of an automated merchant ship.**

Such a ship could, ideally, sail without a crew from the point where the pilot is dropped on the outbound journey to the time a pilot is needed at destination.

The Norden contract includes: Over-all ship automation, need for computation equipment, navigation and collision problems, propulsion, and economics of construction and design. Two other United Aircraft divisions will participate: Pratt & Whitney Aircraft and Hamilton Standard.

Metalworkers Gain in Defense Spending Changes

(Millions of dollars)

PROPOSED ADDITIONS		PROPOSED CUTS	
Army National Guard & Reserves	$105.4	Travel of Personnel	$73.1
Army modernization	207.6	Transfer of funds	15.5
Airlift planes	250.0	Administrative cuts	33.6
Fighter aircraft	215.0	Communications consolidation	84.3
Spares for airborne alert	115.0	Operation savings	85.8
Minuteman speedup	20.7	Army procurement	128.0
Polaris submarine speedup	241.0	Over-all procurement cut	400.5
Antisubmarine warfare	321.0	Cancellation of aircraft carrier	293.0
Midas, Samos & Discoverer speedup	54.0	Cutback of Bomarc	294.0
Total	$1,529.7	Total	$1,407.8

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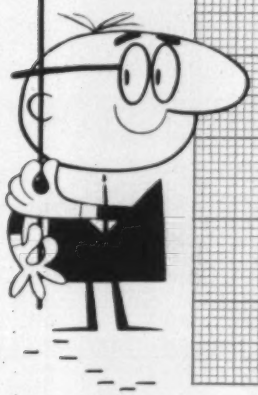
NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

PRODUCTION EFFICIENCY



HOW TO ENGINEER FOR IT

AN ASSEMBLY machine for one of the Big Three auto companies has been sitting on the builder's floor nine months. The problem: Debugging.

AN APPLIANCE maker misspecified requirements for its new equipment. A three month's delivery delay and $6000 in added costs resulted.

THE GREATEST speed engendered by a device "guaranteed" to make industrial brushes faster was that with which the unhappy buyer went to court.

Those are failures to engineer for production efficiency. Reluctance or inability of users to spend money for machinery are the usual blocks to greater productivity. But here the users are ready to buy equipment. Engineering errors delayed or nullified expected gains.

How do you engineer for production efficiency?

The first clue is found in the answer to a related question: Who pays for engineering?

A panel of builders and users at a conference on manufacturing automation at Purdue University (co-sponsored by *Automation*, a Penton publication) answered that query with: "The customer sometimes pays for the engineering as a part of the price of the article he buys. Sometimes he pays for it separately. Sometimes he buys engineering only. Occasionally, he manages to underpay, or not to pay at all. But the principle stands: The customer pays."

The customer can engineer for production efficiency by finding the right answer to these questions:

1. How do you minimize engineering costs without sacrificing quality?
2. How do you get maximum quality for what you pay?
3. How and when do you pay?
4. Should builders charge for all proposals?

Minimize Costs

The tradition of fixed prices in standard equipment tends to make you overlook the cost of engineering. It's still there but averaged over so many sales that your share is relatively small. The trend today is toward more special equipment and automation (see the chart on Page 62).

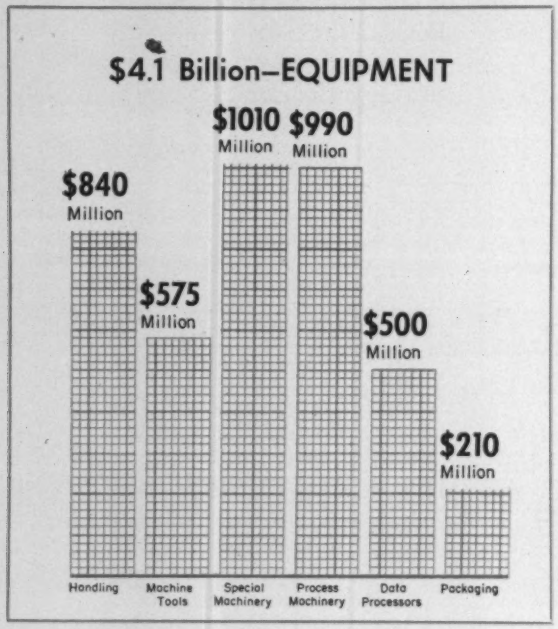
International Business Machines Corp., for example, has boosted its spending for specials from 3 to 27 per cent of total equipment expenditures in the last ten years.

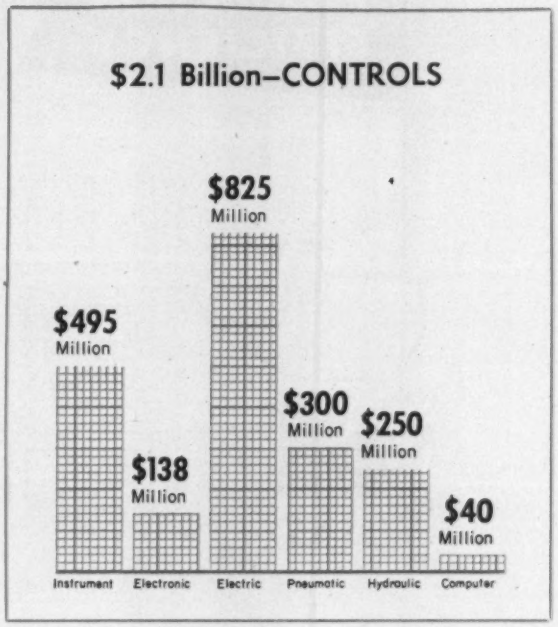
The trend is boosting costs because more engineering is needed to develop the machine and because fewer sales are made and the engineering expense can't be spread so widely.

L. P. Gajda, vice president-engineering for Snyder Corp. in Detroit, cites the case of the typical rotary index machine, a garden variety special. Its total cost is $35,000. Engineering costs $2800 or 8 per cent. A center column type of special machine tool costs $120,000. Engineering costs $24,000 or 20 per cent.

The accompanying checklist gives

Special Equipment Market for 1960





Source: *Automation.*

some clues on how to keep those costs in line. The central idea: Know your builder.

A second avenue to minimizing engineering costs: Know what you want the equipment to do. Do you need it to produce 100,000 units a year or 1 million? For example: The Big Three auto companies underestimated demand for compact cars and underequipped. To add capacity fast, they've had to pay premium engineering charges.

Another case in point: The buyer who specifies a machine tool that will hold tolerances of plus or minus 0.0005 in. when all he really needs is 0.005 in.

Engineering costs also go up when the builder of machines exceeds the specs "just to be safe." Foreign builders seldom do that.

A third approach to lower engineering costs involves getting the special on as near a standard basis as possible. The building block concept helps here. Heald Machine Co., a subsidiary of Cincinnati Milling Machine Co., has an example. Its universal grinder is built from standard elements that can be integrated to do virtually any combination of roughing, semifinishing, and finishing operations.

A related method: Buy standard machines and do your own tooling.

Maximize Quality

Many approaches will help (see the accompanying list), but three are musts.

First, be certain your vender understands you, and also make sure you understand him. Put everything in writing, particularly your mutual agreement on debugging procedures. Most of the bigger equipment buyers demand that the equipment be debugged before they'll accept delivery and make payment. Chrysler Corp. runs "capability" tests to determine if the equipment meets its standards.

The second must is greater manufacturing research—both by buyers and sellers of equipment. Expenditures for research and development in the U. S. have blossomed from only $2 billion in 1948 to an estimated $12 billion in 1959, points out Theodore R. Bunnell, manager of manufacturing services for the Semiconductor Div., Sylvania Electric Products Inc. Partial explanation for the increase comes from Dr. Raymond H. Ewell, formerly with the National Science Foundation. He tallied those portions of the gross national product for 1953 that could be attributed to discoveries of the previous 25 years. American industry realized $25 to $50 for each dollar it spent on research.

The third key to maximum engineering quality is to organize to buy equipment (STEEL, Feb. 22, p. 43). Comments K. C. Butterfield, staff master mechanic for Chrysler Corp.: "When the integrated buying team functions as it should, the problems of pre-engineering and excessive costs are materially reduced."

The chief members of Chrysler's team are the process engineer, the purchasing agent, and the plant and divisional managers. The process engineer initiates projects; the purchasing agent is the eyes, ears, and communications center for the process engineer; plant and divisional managers say yes or no, and co-

How to Minimize Engineering Costs

1. Know your vender; buy experience.
2. Play fair with your builder; cavalier treatment of his ideas will alienate a valuable ally in your war against costs.
3. Don't ask for too many quotes; three or four are often enough.
4. Know what you want the equipment to do.
5. Don't overspecify but give complete, precise specifications.
6. Agree in advance on arrangements for debugging.
7. Put everything in writing.
8. Predict expected sales accurately, so you can specify the capacity needed.
9. Get your special machine on as near a standard basis as possible.
10. Give the builder time to do his job.

How to Maximize Engineering Quality

1. Make communication lines with your vender as clear as possible.
2. Co-operate fully with your builder's requests for additional information on your product and facilities.
3. Insist on high but reasonable performance guarantees.
4. Recognize that your builder performs best when he makes a reasonable profit.
5. Do more manufacturing research.
6. Co-ordinate your own research and engineering with your vender's.
7. Provide the builder with adequate stock to run samples on the new machine.
8. Insist on prototypes in the case of specials.
9. Use the team approach in buying.
10. Give concrete evidence that you are sincere in your plans to buy.

ordinate proposals with long term objectives.

How, When to Pay

The conventional time to pay for equipment is when it is delivered and in working order. But special equipment requires more engineering and leadtime. So, more and more machinery builders are campaigning for progress payments or charges for various parts of the job. Equipment users aren't too enthusiastic. Listen to the argument for a separate quotation fee made by J. R. Barefoot, president of Federal Machine & Welder Co., Warren, Ohio:

"Quotations on special lines of automated machinery no longer simply offer an item of equipment for sale, but they actually perform an engineering function which, prior to the last few years, normally has been performed by a customer's methods and process department. Instead of utilizing their own engineers to develop the proper methods and sequence of operations for a particular assembly, the trend is to have these engineering functions performed by prospective suppliers of the equipment for producing the product."

Mr. Barefoot also suggests a tryout charge to cover the increasingly expensive debugging procedures for special equipment. That, too, is against current practice, but hear Mr. Barefoot's argument:

"The most simple looking minor problem in the quotation stage can turn out to be a major one during the tryout of the line. It can completely drain the job profitwise. Manufacturers of special lines are building up a backlog of data on debugging costs and should be able to average these out. They can then be presented as a charge for tryout."

The tryout fee is extremely unusual, but a few builders make special engineering charges.

W. K. Stokes, vice president-sales for Alvey-Ferguson Co., Cincinnati, cites the case of a complex proposal request. It was so difficult that no one in the business of making conveying equipment wanted to do it free. Presented with a united front, the potential buyer asked for bids on the proposal. Alvey-Ferguson won the bid. Once the proposal is ready, the user will present it to builders in seeking equipment bids.

You even have some advantages in paying separately for engineering. You are the undisputed owner of the design and perhaps can get patent rights which otherwise would be assigned to the builder.

A separate engineering charge can also win you a better deal on depreciation (STEEL, May 2, p. 43). Engineering costs are often mistakenly mixed with depreciation. Genuine engineering costs can be expensed in the year they were incurred. A separate billing will help in case of argument with Internal Revenue agents.

Users generally agree that they should pay separately for the cost of a proposal if the equipment is extremely special. The argument: What's extreme?

Proposal Fees?

Mr. Barefoot says Federal Machine & Welder's average cost for a proposal is $3000. It has spent as much as $12,000.

Mr. Stokes reports that Alvey-

Who Owns Design Ideas?

GE's William W. Kuyper says:

When a man buys a standard No. 5 milling machine, he buys the engineering of the machine. If he buys fixtures for the machine, he pays for the engineering in the price of the fixtures. He does not own the design of the machine, and he usually does not own the design of the fixtures. But both the vender and the purchaser usually feel free to use the fixture designs as they see fit.

When a man buys a special machine of standard type, the situation is much the same.

When special machines of a new type are purchased, the problems are similar, but a little harder to solve. In general, the only time the question of direct payment of engineering costs is raised is . . . as a matter of assuring good faith and serious intentions on the part of the customer.

The problems of who pays and when get really sticky only in special circumstances: A customer needs equipment where straightforward design and construction alone are not adequate for completion of the job; debugging is likely to be excessive; pretrial of basic ideas is necessary; there are no other probable customers; the hazards are considerable; or the customer desires to keep a close control over the development he pays for.

In many of these cases, the customer tries to design and develop his own tools. Then he is more likely to own the results—at the price of paying for all engineering and false starts. This procedure is more likely only because of the possible incidence of adverse patents, or the disclosure of his own knowledge to others.

Ferguson's average engineering cost per hour is $10, and that expenses of $2000 to $3000 per proposal are not uncommon.

Such situations prompt some equipment manufacturers to campaign for a fee system similar to that charged by architects. They want the winning bidder and losers to be paid for engineering.

Equipment users checked by STEEL are almost unanimously against a fee system. Even some builders are opposed. Here are the objections of one:

1. The fee system would be difficult to police. In tough times, hungry companies might forego the fee.
2. It might hit antitrust snags.
3. Any unsuccessful bid, if paid for by the user, would become the user's property. The plans might contain something the builder wants to try again.

Yet the builders have their problems. Here's an example cited by Mr. Stokes, of why they seek relief:

"We were asked to bid on a small job which ran less than $1000 but required some layout work and a detailed estimate. The purchaser inadvertently sent us all copies of the bid requests—18 of them. Several firms probably would not bid, but assuming they did and assuming that the estimating costs were a nominal $60 for each bidder, the total cost of bid preparations would have been more than the amount of the order."

Most buyers—and builders—would agree with W. W. Kuyper, manager of manufacturing engineering for General Electric Co.'s Large Steam Turbine-Generator Dept., when he says:

"So the customer pays, and he holds the controlling reins. He is limited in the speed he can travel by the limits of the industry from which he seeks help and by his own astuteness as a customer. He has the full resources of industry at his command. He needs only to present a challenge to which a vender can respond with advantage to both parties."

Production Efficiency

How to Pick the Vender

On May 30, STEEL will give tips on solving this thorny problem in buying equipment. For a free copy of any or all articles in this Program for Management series (running every other week since Jan. 11), write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. By using material like this, you may win $1000. For details, see Pages 5 and 6.

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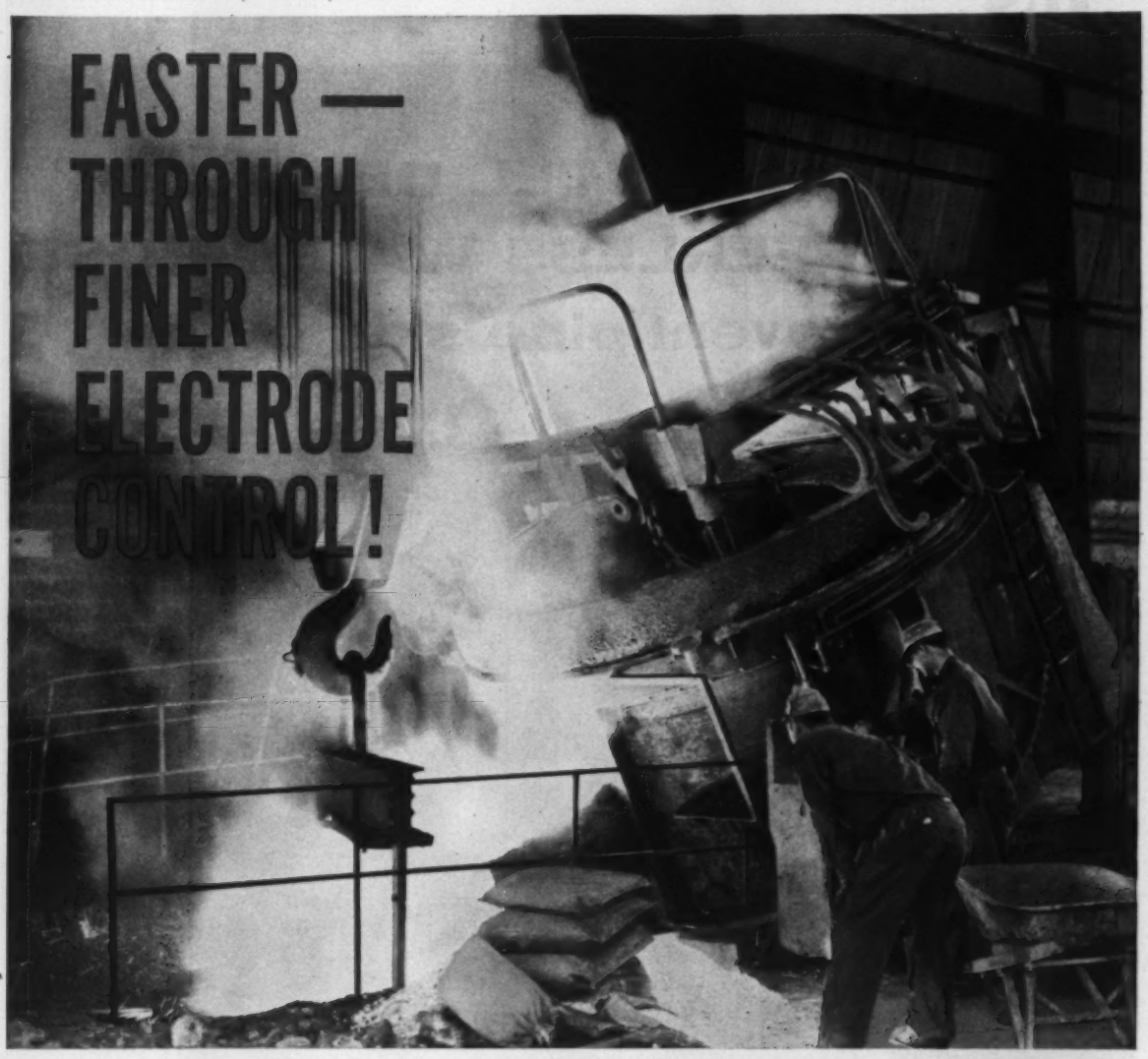

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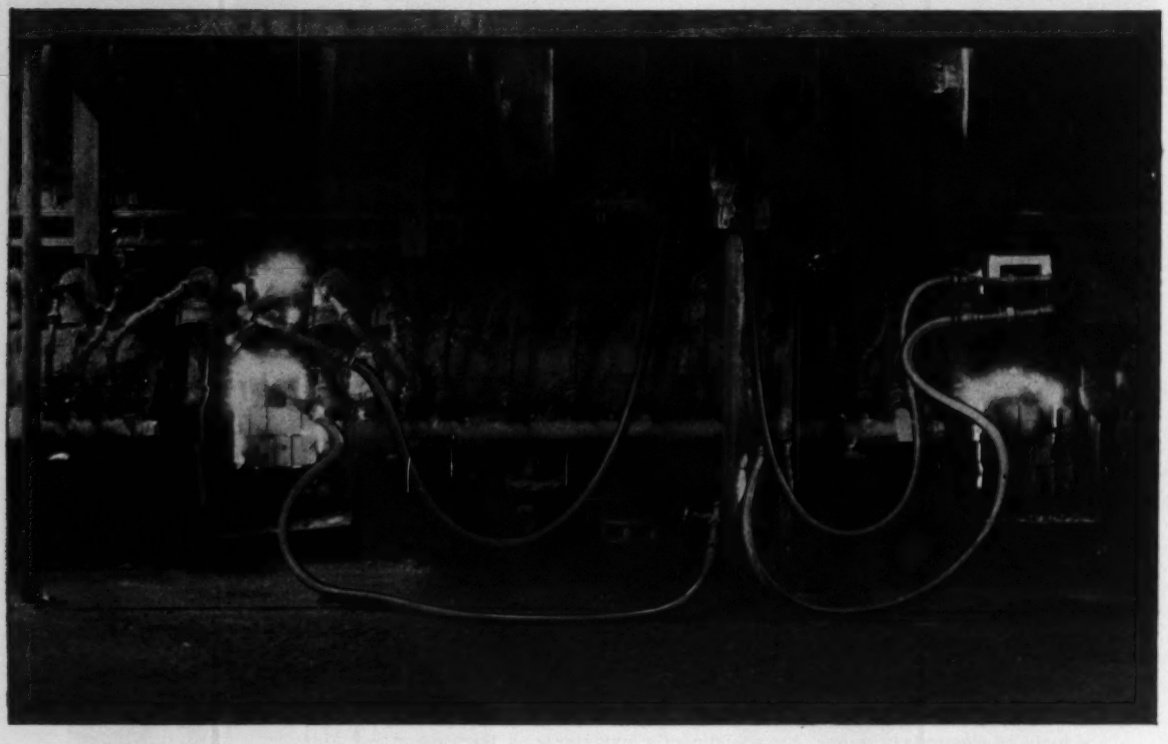

In the Fretz-Moon furnace of this Kaiser Steel Mill in Fontana, Calif., one length of U.S. Peerless® Water Hose ("the hose with the good brown cover") carries cold water to the pipe skids, another length carries the return hot water—up to 200° F. If the hose should fail or kink, the pipe skids would burn up and costly repairs and downtime would follow.

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Monorail cradle dips car down and wheels touch ground for the first time

Corvair Readied for Round 2

THE MAKERS of Corvair have been fighting an uphill battle since the first day word leaked out of GM design shops that Chevrolet's compact car would be radically different from the typical "Detroit iron" that had been offered for the last decade. They've been plagued by mechanical bugs and lack of materials.

Now the major engineering problems appear to have been licked. Although Chevrolet has mixed emotions about Corvair's sales rate, the division still feels its basic concept of a compact car is correct.

Look for Corvair's backers to carry the competitive fight back to Falcon next year.

• **Big Buildup** — Chevy's compact probably had the greatest pre-introduction buildup of any car since the late Edsel. Talk about its rear mounted, air cooled, aluminum engine overshadowed most of the speculation about Ford's Falcon and Chrysler's Valiant. Edward N. Cole, Chevrolet's general manager, forecast that Corvair would take 20 per cent of his division's sales. It was to usher in a new era in U. S. automobile design.

• **Rumors**—But shortly after the car appeared, a flood of ugly rumors cropped up: Fan belts kept slipping off. Carburetors iced, stalling many cars. Gas mileage left much to be desired.

Metalworking circles buzzed with talk about Chevy's troubles in casting the aluminum engine blocks and heads. The two stage parking brake confused some buyers. For the final touch, Chevrolet had to shut down production at the tag end of the steel strike while Falcon kept right on booming. Talk around autodom had it that Mr. Cole would find his position precarious if he couldn't make Corvair click.

Not all the rumors were true, but there were enough bugs to make for long silences when the subject

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U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,757
February	659,323	478,484
March	654,242	576,085
April	582,909	578,825
4 Mo. Totals	2,585,205	2,179,151
May		546,817
June		557,994
July		555,418
August		239,152
September		258,157
October		507,530
November		254,527
December		494,931
Total		5,593,677

Week Ended	1960	1959
Apr. 9	133,460	133,202
Apr. 16	135,402	135,934
Apr. 23	144,886	133,987
Apr. 30	135,515	118,059
May 7	142,939†	134,763
May 14	144,000*	135,856

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

came up for conversation at the GM Building.

STEEL tried out a Corvair with an automatic shift on a 560 mile trip earlier this year. Gas mileage was low—15.8 mpg at 60 mph—and the heater wasn't adequate for the cold weather. But we experienced no motor problems due to icing, nor did the fan belt snap off. However, compared with the Valiant and Falcon, Corvair seating and comfort did leave something to be desired.

• **Rectifying**—Instead of talking, GM and Mr. Cole have been busy correcting Corvair. A deep groove idler pulley and a slightly longer plain belt instead of the original cogged one have licked fan belt slippage. A redesigned air scoop permits more manifold heat to flow over the venturi tubes to eliminate carburetor icing. A change in the spacer between the carburetor and manifold has corrected throttle icing.

The heater has been rewired and a couple of holes drilled in the heat exhaust pipe to reduce noise. Those changes also have helped improve fuel economy because the engine now runs on a leaner mixture (the industry's cynics claim warmer weather has been an even bigger aid). The two stage parking brake has been replaced. Several other minor bugs have been eliminated. Still unchanged: Limited trunk space and uncomfortable seats.

• **Reduced** — All those problems, however, have put Corvair behind competition saleswise. Since the first of the year, 75,400 Corvairs have been sold. That's an average of 10.4 per dealer. Falcon sales for the same period total 170,000, or 24.8 per dealer.

The comparison certainly doesn't make Chevrolet happy. Neither is the division enthralled by the fact that Corvair is accounting for 13 per cent of Chevy's total sales instead of the 20 per cent that was programed. It's particularly irritating because Falcon is taking more than a third of Ford Div. car sales.

• **Reclaimed**—But the GM division is not completely disconsolate. Total car sales are 21 per cent ahead of last year's while Ford shows only an 18 per cent increase. Standard sized Chevy's are 97,000 units ahead of standard Fords which have fallen slightly behind 1959's sales rate. GM marketers are quick to point out that two-thirds of Chevrolet's total sales boost over 1959 comes from Corvair. "If it were any higher, we'd be cutting into our regular car sales," claims one division source.

The last point has merit. Detroit has noticed that Ford is reluctant to talk about Falcon's penetration into Fairlane ranks. The compacts have slightly smaller profit margins. Suppose the net profit difference between Falcon and Fairlane is $7. If Ford sells half a million Falcons and 150,000 of those deals are made at the expense of Fairlane sales, it means a net profit potential of $1 million won't be realized regardless of how many cars are sold. In this respect, Mr. Cole's approach to the compact market seems completely correct. Corvair appears to be robbing no other domestic GM make of sales. It simply fills a market gap that the company was unable to cover before.

• **Reconciled**—Corvair planning is being done with this in mind. Its compact truck will be announced soon. Introduction of the station wagon is expected in the fall (see STEEL, May 9, p. 111). There's talk of a manifold heater to replace the gasoline job. Seat design is being scrutinized. The next design change will provide more trunk space, say Chevrolet engineers.

The division already is taking advantage of a trend toward luxury in compact car sales. *Ward's Automotive Reports* points out that 70 per cent of the buyers of Big Three compacts are purchasing the de luxe series cars. Corvair aims to take advantage of this fact through the introduction of its Monza 900. This trimmed up, two door Corvair sells for $2240, which is $200 more than regular Corvairs and Falcons. It competes pricewise with regular Chevrolets and Fords.

• **Remarks**—Just how the stylish Monza fits into Chevy's long range planning may be open to question. Talking to dealers last week, Mr. Cole said: "The theme of the 1960s will be functionalism with thrift. Styling will be simple and unadorned. Annual model changes will not involve massive and exotic changes, but will consist generally of refinements to improve products and give the customer greater dollar value."

Planning A Trip?

You may be driving a brand new Ford. Free use of a Falcon, Fairlane, Fairlane 500, Galaxie, Station Wagon, or a Thunderbird is yours for two weeks if you Beat the Experts at predicting U. S. passenger car production for 1960.

The five next best guessers will win full color prints of a futuristic dream car conceived and rendered for STEEL's contest by Virgil Exner, vice president and director of styling, Chrysler Corp. See the Servicenter, Page 5, for an entry blank.

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However, if the same customer decided to flame cut the parts himself, 106,800 lbs. of 3½" gage steel plate stock would be required. Cost of shipment . . . $2157.36. Extra cost to the customer on freight alone . . . $1663.47. *Plus* . . . the expense of his equipment investment . . . the tie-up of his capital in plate stock . . . the cost of handling 75% scrap . . . the problem of shop spoilage.

Moral: Don't pay freight on scrap. Contact Lukens for Steel Plate Shapes Service . . . flame cutting, shearing, blanking, bending, pressing, welding—of carbon and alloy plate produced on our own rolling mills. Call or write Fabrication Building, Lukens Steel Company, Coatesville, Pennsylvania.

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Please send me your free booklet on Steel Plates Shapes.

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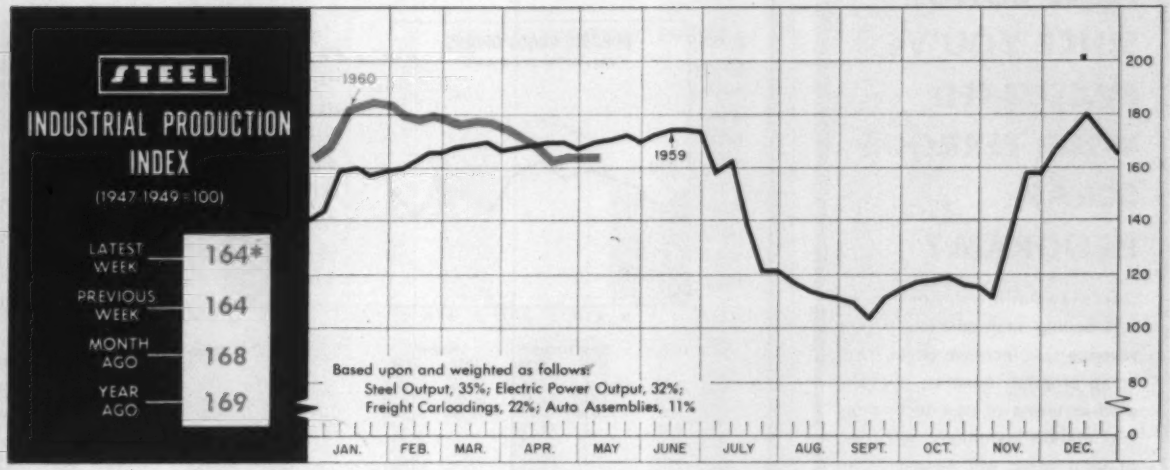

*Week ended May 7.

Business Outlook Strengthening

THE FEELING is growing among business observers that 1960 is going to be a carbon copy of 1956—the year that started sluggishly but turned out to be the best up to that time. (One exception: We won't have a steel strike this year.)

To the chart watchers, 1956 was the year when the eight leading business indicators went wrong. (The eight: Business failures and liabilities; industrial common stock price index; new orders—durable goods industries; residential building contracts; commercial and industrial building contracts; average hours worked per week; new incorporations; and the wholesale price index.) Those indicators gave what many believed was a clear indication of a weakening in the economy, but it was a false storm warning. The latest indication from the same barometers tells the same story, but this time validity of the warning is being challenged because of bullish sentiment and some hard facts.

• **Parallel**—Here is how the situation today compares with that of four years ago: After showing boom tendencies throughout 1955, three of the eight leading indicators showed a general decline during the early months of 1956. One (business failures) fluctuated so wildly as to be considered neutral. The other four were still uptrending.

At the end of the first quarter of this year, four indicators were below the level of the previous month while four were above. The trend for the quarter was difficult to peg for some because of seesaw patterns, but generally it could be said the composite was weaker than in the fourth quarter of 1959.

(The eight indicators have shown a tendency over the years to precede a trend in the general economy by as little as two and a half or as much as ten and a half months.)

• **One Step Farther**—Another simi-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,102[1]	2,137	2,631
Electric Power Distributed (million kw-hr)	13,400[1]	13,300	12,659
Bituminous Coal Output (1000 tons)	8,305[1]	8,555	8,364
Crude Oil Production (daily avg—1000 bbl)	7,000[1]	7,014	7,200
Construction Volume (*ENR*—millions)	$530.4	$493.1	$433.2
Auto, Truck Output, U. S., Canada (*Ward's*)	179,650[1]	172,971	170,993
TRADE			
Freight Carloadings (1000 Cars)	650[1]	643	677
Intercity Truck Tonnage (changes from year ago)	n.a.	−4.8%	+18.4%
Business Failures (Dun & Bradstreet)	325	283	275
Currency in Circulation (millions)[3]	$31,603	$31,581	$31,368
Dept. Store Sales (changes from year ago)[3]	+8%	+4%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$29.950	$26,179	$26,398
Federal Gross Debt (billions)	$288.8	$289.1	$285.2
Bond Volume, NYSE (millions)	$24.3	$26.5	$31.9
Stocks Sales, NYSE (thousands of shares)	13.956	14,973	18.994
Loans and Investments (billions)[4]	$103 1	$103.6	$102.5
U. S. Govt. Obligations Held (billions)[4]	$26.0	$26.2	$31.9
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	230.7	230.7	222.1
All Commodities[7]	119.3	119.8	119.6
Commodities Other than Farm & Foods[7]	128.4	128.6	127.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,844,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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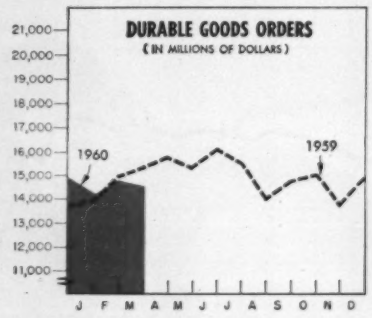
THE BUSINESS TREND



	New Orders* 1960	New Orders* 1959	Sales* 1960	Sales* 1959
Jan.	14,190	13,900	15,450	13,541
Feb.	14,800	14,918	15,670	13,870
Mar.	14,480†	15,323	15,160†	14,400
Apr.	.....	15,796	.....	15,166
May	.....	15,241	.....	15,515
June	.....	16,133	.....	15,771
July	.....	15,493	.....	15,384
Aug.	.....	13,974	.....	14,008
Sept.	.....	14,747	.....	14,113
Oct.	.....	15,099	.....	14,047
Nov.	.....	13,721	.....	13,479
Dec.	.....	14,770	.....	15,010

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.
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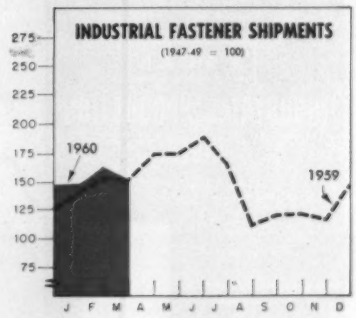


	(Seasonally adjusted) 1960	1959	1958	1957
Jan.	149	140	133	173
Feb.	164	153	117	177
Mar.	152	152	103	166
Apr.	...	175	102	157
May	...	175	111	168
June	...	187	120	162
July	...	165	133	184
Aug.	...	111	120	155
Sept.	...	119	141	159
Oct.	...	120	137	163
Nov.	...	115	134	147
Dec.	...	147	152	140
Avg	...	146	125	162

Industrial Fasteners Institute.

larity between the two years is the behavior of the Federal Reserve Board's industrial production index. After rising rapidly during 1955, the trend line leveled off, then dipped a little during the first half of 1956. Parallel: After rising sharply during 1959, the FRB index has taken a breather in early 1960.

Even the drop in STEEL's industrial production index has a parallel of sorts in 1960, when the trend line for the year resembled a saucer (with the exception of the steel strike period). However, the cutbacks in the steel industry in 1960 have caused the dip to be somewhat greater than it was four years ago.

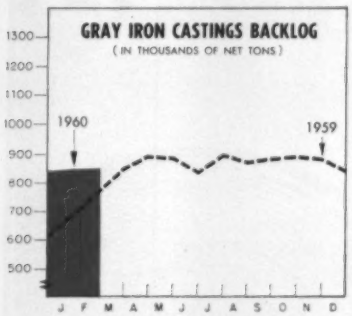
• **Better Things Ahead** — Finally, in 1956, the trends started to respond just before the steel strike hit, then resumed after the strike was settled. Many executives feel that even though there will be no false stimulus to business, such as the recovery from another major strike, this year is going to see a similar upturn in the last half, forestalling the decline indicated by the barometers.

Business sentiment is important. During STEEL's coast-to-coast air safari, a pessimistic metalworking executive has been the exception rather than the rule. (See May 2 issue, pp. 33-35, and May 9 issue, pp. 95-97, and Pages 51-53 of this issue.) They admit to some uncertainty about how deep the saucer will be, but they are certain that nothing is going to take a chip out of the upturn on the other side.

• **Forecasts Become Facts** — Much of the optimism is based on the latest surveys of business spending plans. The Securities & Exchange Commission's surveys have seldom been wrong in direction and have usually been conservative in magnitude. With $37 billion slated to go into plant and equipment this year, many businessmen can't see anything but sound business well into 1961.

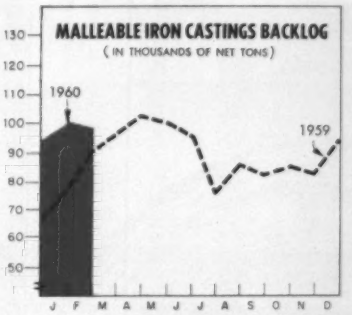
• **Consumers Perking Up** — The spending attitude of the consumer has been held in check during much of this year by the effects of the steel strike and unusually cold weather in March. But the situation is improving. Most encouraging is the rate of new automobile sales. April sales set a 54 month high, declares *Ward's Automotive Reports*.

Record sales have eaten into deal-



	Shipments 1960	Shipments 1959	Unfilled Orders* 1960	Unfilled Orders* 1959
Jan.	1,136	1,002	851	687
Feb.	1,108	1,037	855	767
Mar.	1,205			847
Apr.	1,246			892
May	1,236			885
June	1,252			837
July	933			898
Aug.	743			873
Sept.	850			883
Oct.	872			887
Nov.	831			885
Dec.	1,108			846
Total	12,315			

*For sale. U. S. Bureau of the Census.



	Shipments 1960	Shipments 1959	Unfilled Orders* 1960	Unfilled Orders* 1959
Jan.	83.2	73.2	100.3	77.3
Feb.	83.1	74.7	98.3	90.3
Mar.		84.3		95.8
Apr.		91.0		102.5
May		83.5		99.9
June		85.5		95.3
July		69.2		75.3
Aug.		65.1		85.9
Sept.		76.1		82.3
Oct.		75.5		85.0
Nov.		58.2		82.6
Dec.		80.1		93.9
Total	916.4			

*For sale. U. S. Bureau of the Census.

ers' stocks for the first time this year, and they have brought about an upward revision in production schedules. Producers of parts are getting orders for increased releases after taking cuts in February and March. One steel producer told STEEL that he had received significantly larger orders for May-June delivery than he had anticipated.

Department store goods are also moving at a faster clip. April department store sales pushed to a record. More evidence of the increase in commerce: Bank clearings hit an all-time record of nearly $30 billion in the week ended May 4, reports Dun and Bradstreet Inc.

Production Index Holds

STEEL's industrial production index, which is heavily influenced by steel production, gives further evidence that the business situation is firming. For three weeks in a row, it has stood at 164 (1947-49 = 100), despite the persistent decline in steelmaking operations. Freight carloadings are improving seasonally. Electricity generation, which has passed its seasonal low point, will stabilize at about 13.4 billion kw-hr a week until the summer heat pushes it to new highs. Auto production schedules are advancing again.

The index has just about found its level for the immediate future. There may be small declines, especially if labor troubles hit the auto industry, but the big drops are behind (except for holiday weeks).

Contracts Still Flowing

Construction statistics continue to look good. *Engineering News-Record* reports that contract awards valued at $530.4 million in the week ended May 5 were the second highest of the year. They boost the cumulative total for 1960 to 10 per cent above the corresponding 1959 figure. Last week, the bulge was only 8 per cent.

Dun & Bradstreet Inc. reports that building permits in March jumped 47.5 per cent above the February figure.

The bulge in contract activity is expected to boost expenditures for work put in place later this year and overcome the lag developing in the early months of 1960. Despite an increase of 8 per cent in construction put in place in April over March, the year to date is 3 per cent below the similar period of 1959.

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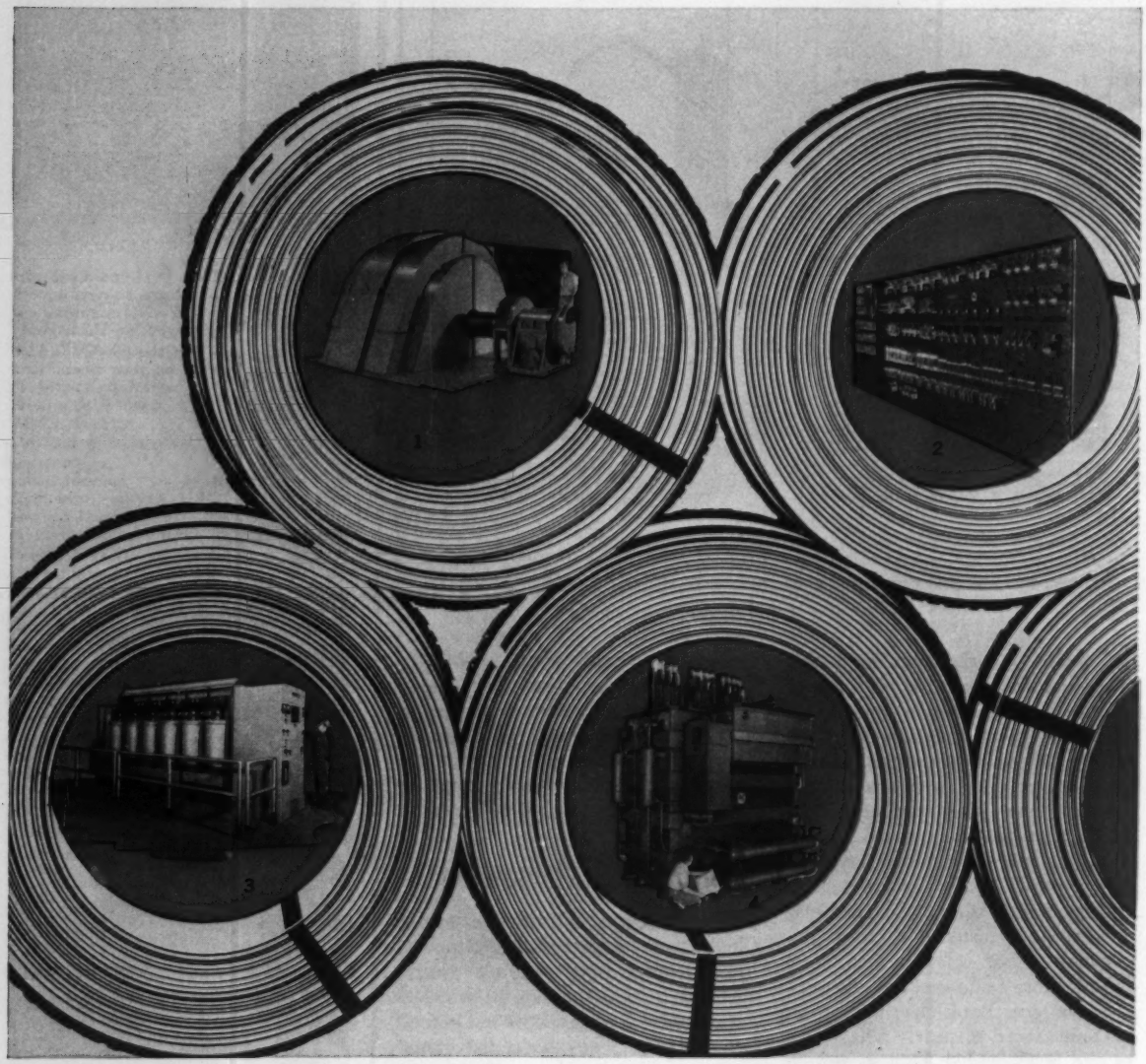

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A. WILLARD HOFFMAN
Brewer-Titchener v. p.

A. S. BURGOYNE
new post at Bliss

H. E. HANSON
Fairbanks, Morse v. p.

ROBERT E. YOUNG
Aluminium Ltd. Sales v. p.

A. Willard Hoffman was made vice president - purchasing, **Brewer-Titchener Corp.**, Cortland, N. Y. He was director of purchases.

A. S. Burgoyne, vice president-manufacturing, **E. W. Bliss Co.**, Canton, Ohio, was appointed to the new post of vice president and manager of the company's Press & Die Supply Div. **Einar W. Sundberg**, former vice president, treasurer-secretary of Gamewell Co., subsidiary, becomes treasurer of Bliss. **W. H. Garrison**, former treasurer (who retires next year) was named assistant treasurer and assistant secretary.

Louis M. Millon fills the new post of general manufacturing manager, **Ternstedt Div.**, Detroit, General Motors Corp. He is replaced as resident manager at Ternstedt's Flint, Mich., plant by **Edmund T. Henry. Louis J. Grimaldi**, works manager at Flint, was made resident manager at Trenton, N. J., plant.

Melvin D. Verson, administration vice president, **Verson Allsteel Press Co.**, Chicago, was elected president and chief executive officer.

H. S. Faust was made chairman of **Hansell-Elcock Co.**, Chicago. Former president, he is succeeded by **George R. Winter**, executive vice president.

George M. Bassnett was made director of European operations for **Thew Shovel Co.**, Lorain, Ohio. He will establish residence in The Hague, Netherlands, in the near future.

H. E. Hanson was named vice president of **Fairbanks, Morse & Co.** and appointed general manager of its Beloit, Wis., Div. He went to Beloit in October, 1959, as general manager of the Diesel Engine, Compressor, Locomotive Group, and has been acting manager of the division since last January.

Henry G. Evans was elected vice president-production and **Robert N. Merk** vice president-engineering for **Sharon Steel Corp.**, Sharon, Pa.

Alvin J. Jones and **D. M. Hallier** were elected vice presidents of **Motch & Merryweather Machinery Co.**, Cleveland. Mr. Jones will be manager of the Machine Tool Mfg. Div. at the Euclid plant. Mr. Hallier is manager of the Cutting Tool Mfg. Div. and the Allied Products Div.

Andrew T. Marchuk was elected vice president of **Novo Industrial Corp.** (formerly Industrial Enterprises Inc.) and president and general manager of its Milwaukee Crane Div. at Cudahy, Wis. **Clarence G. Nissen**, former president and a cofounder of the division, has resigned. He is available as a consultant.

P. R. Holmes was made assistant plant manager, Downey, Calif., for **Aerojet-General Corp.**, subsidiary of General Tire & Rubber Co. He was manager of the Manufacturing Div. of Aerojet-Downey, and is succeeded by **W. J. Wiley**, former manager of missile manufacturing at the Downey plant.

Robert E. Young, U. S. sales manager of **Aluminium Ltd. Sales Inc.**, New York, was named a vice president of the company, subsidiary of Aluminium Ltd.

Merrill A. Hayden, general manager, Machinery Hydraulics Div., **Vickers Inc.**, Detroit, was elected a vice president of the company.

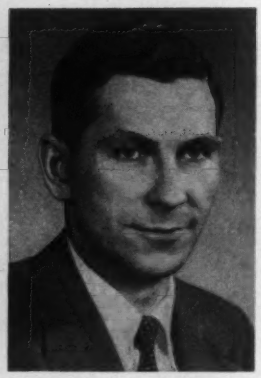
R. Jamison Williams, executive vice president, was elected president of **American Metal Products Co.**, Detroit. **Frederick C. Matthaei Jr.** was named executive vice president, advancing from vice president-research and development. **Andrew M. Mras**, former president, was elected chairman to succeed **Douglas F. Roby** who remains a member of the executive committee and will also serve as a senior consultant.

Acme Precision Products Inc., Dayton, Ohio, elected **John A. Matousek** president to succeed **E. Franklin Hatch**, now chairman. **Karl A. Stein**, former chairman, has resigned. The new president, who joined the firm about a year ago as vice president and general manager, is also president of Cal-Tronics Corp., subsidiary.

J. N. Bauman, president of **White Motor Co.**, Cleveland, since 1956, was made chief executive officer, a post held the last 25 years by **Robert F. Black**, chairman.

Charles W. Curtis was made manager of **Hughes Aircraft Co.'s** newly formed Components Div., Culver City, Calif. He was acting manager

ROBERT E. SAVAGE



KENNETH A. DeLONGE

Inco Primary Nickel Dept. appointments

JOHN W. AMENT

CARL J. BRUNN

Transue & Williams vice presidents

of the company's microwave laboratory.

Robert E. Savage was appointed foundry industry manager for the Primary Nickel Dept. of **International Nickel Co. Inc.**, New York. **Kenneth A. DeLonge** was made manager, direct sales, Primary Nickel Dept.

Verle B. Utzinger joined **Sloan Valve Co.**, Chicago, as assistant plant superintendent in charge of foundry operations. He was superintendent of foundries at Walworth Co.

William L. Lukens was elected vice president and assistant to the president, **National Twist Drill & Tool Co.**, Rochester, Mich. He has been serving in the latter post.

Daniel E. Watkins and **Robert N. Voight** were elected vice presidents of **United States Pipe & Foundry Co.**, Birmingham. Mr. Watkins has been general superintendent-blast furnaces and coke ovens since 1952. Mr. Voight has been general works manager.

John W. Ament and **Carl J. Brunn** were elected vice presidents of **Transue & Williams Steel Forging Corp.**, Alliance, Ohio. Mr. Ament becomes vice president-sales, Forging Div.; Mr. Brunn vice president-sales, Stamping Div.

Robert N. King was made foreign sales director for **Signode Steel Strapping Co.**, Chicago.

Gus A. Dies was named sales manager of the Metal Div. of the St. Louis branch of **National Lead Co.**

Lawrence H. Cousineau was elected president of **Heald Machine Co.**, Worcester, Mass., subsidiary of Cincinnati Milling Machine Co. He succeeds **Carles F. Roby,** recently retired. **Hartwell G. Howe** was made vice president and general manager of Heald succeeding **Carl M. Beach,** who relinquishes duties for health reasons and returns to the parent company in Cincinnati. Mr. Cousineau is also serving as administrative vice president of Cincinnati Milling. **Glenn C. Moore,** export sales manager, assumes Mr. Howe's duties as domestic sales manager for Heald, and **Charles H. Munsey** takes over as export sales manager.

Philip A. Scheuble Jr. was elected a vice president of **Vapor Heating Corp.**, Chicago. He continues as general manager, Vap-Air Div.

H. J. Howard was appointed sales manager of **Victory Carbide Saw & Tool Co.**, Antioch, Ill. He has been serving the company on the West Coast.

Harry T. Silverman was elected chairman, **Landers, Frary & Clark,** New Britain, Conn., succeeding **Bret C. Neece,** retired. Mr. Silverman continues as president and chief executive officer. **Sol Levine** was made vice president-operations. He was general manager of the subsidiary, Dorset-Rex Inc., and in recent months served as director of operations of all Landers divisions.

H. S. Cain was named sales manager of **Berry Hydraulics Div.,**

DANIEL E. WATKINS

ROBERT N. VOIGHT

U. S. Pipe & Foundry vice presidents

LAWRENCE H. COUSINEAU

HARTWELL G. HOWE

Heald president and vice president-gen. mgr.

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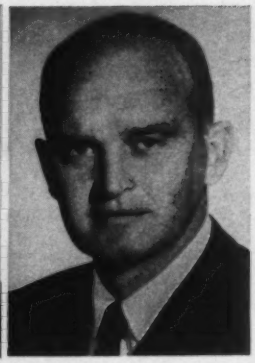
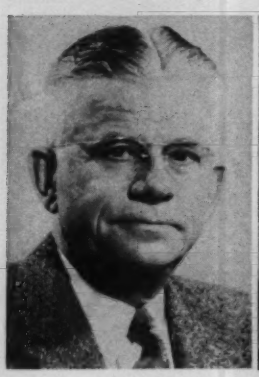
JOHN W. EASON
Revere v. p.

ALBERT P. TIS
Norden-Ketay operations



RICHARD M. CHEWNING
Republic Supply (Calif.) v. p.



H. W. CHRISTENSEN
Fischbach & Moore exec.

WILLIAM B. PAYNE
Progressive Welder sales mgr.

GILBERT W. HUMPHREY
M. A. Hanna president

Oliver Tyrone Corp. in Cornith, Miss.

H. W. Christensen, former chief purchasing executive of U. S. Steel Corp.'s Columbia-Geneva Div., who recently retired as assistant to executive vice president of the division, was appointed executive vice president-commercial of **Fischbach & Moore Inc.,** New York.

Progressive Welder & Machine Co. appointed **William B. Payne** general sales manager of its newly consolidated six divisions. He is located at the Special Machinery Div. in Pontiac, Mich.

John D. Tournaud succeeds **F. B. Cornell,** retired, as Detroit district sales office manager, Refractories Div., **Babcock & Wilcox Co.**

Dr. Charles L. Critchfield joined **Telecomputing Corp.,** Los Angeles, as vice president-research. He was director of scientific research for Convair Div., General Dynamics Corp.

Gilbert W. Humphrey was elected president and chief executive officer of **M. A. Hanna Co.,** Cleveland. He was vice president and also president of Hanna Mining Co. **W. A. Marting** was elected president and chief executive officer of Hanna Mining. He was executive vice president of Hanna Mining and is succeeded by **R. W. Whitney,** former vice president-mining operations.

Eric Rice, sales manager, was elected vice president of **Stokvis-Multiton Corp.,** Port Washington, N. Y. He is in charge of the Material Handling Div.

A. Norman Swanson was appointed manager-sales at **General Elecric Co.'s** Everett, Mass., foundry.

Fred Krieger was appointed metallurgist at the Worcester, Mass., Wire Div., **National-Standard Co.**

Ted N. Powell was made district manager at Kansas City, Mo., for **Byron Jackson Pumps Inc.,** subsidiary of Borg-Warner Corp.

John W. Eason was elected a vice president of **Revere Copper & Brass Inc.,** New York. He will serve as executive head of the Baltimore Div. of which he was manager.

Albert P. Tis was named operations manager of **Norden Div.'s Ketay Dept.,** Commack, N. Y., United Aircraft Corp.

Richard M. Chewning was named vice president and general sales manager, **Republic Supply Co. of California,** Los Angeles. He was vice president in charge of the Southern Div. **H. J. Bedell** was made manager of the new Specialty Metals Div. which serves the industrial, missile, and aircraft markets.

Alexander Beck was elected president, **Whitman Foundry Inc.,** Whitman, Mass., subsidiary of Elliott Addressing Machine Co.

L. Briggs Dunn was made quality control manager, **Brush Instruments Div.,** Cleveland, Clevite Corp.

International Nickel Co. of Canada Ltd., Copper Cliff, Ont., elected as vice presidents: **Richard A. Cabell, Albert P. Gagnebin, Ralph H. Waddington,** and **James C. Parlee.**

Louis A. Mertz was elected senior vice president and **Edward T. Fitch** vice president-financial of **Dravo Corp.,** Pittsburgh.

Marshall W. Davies was made superintendent, Maintenance Dept., at the Cleveland Works of **Jones & Laughlin Steel Corp.** He succeeds **W. R. Roesch,** earlier named assistant to J&L's vice president-engineering and plant.

OBITUARIES...

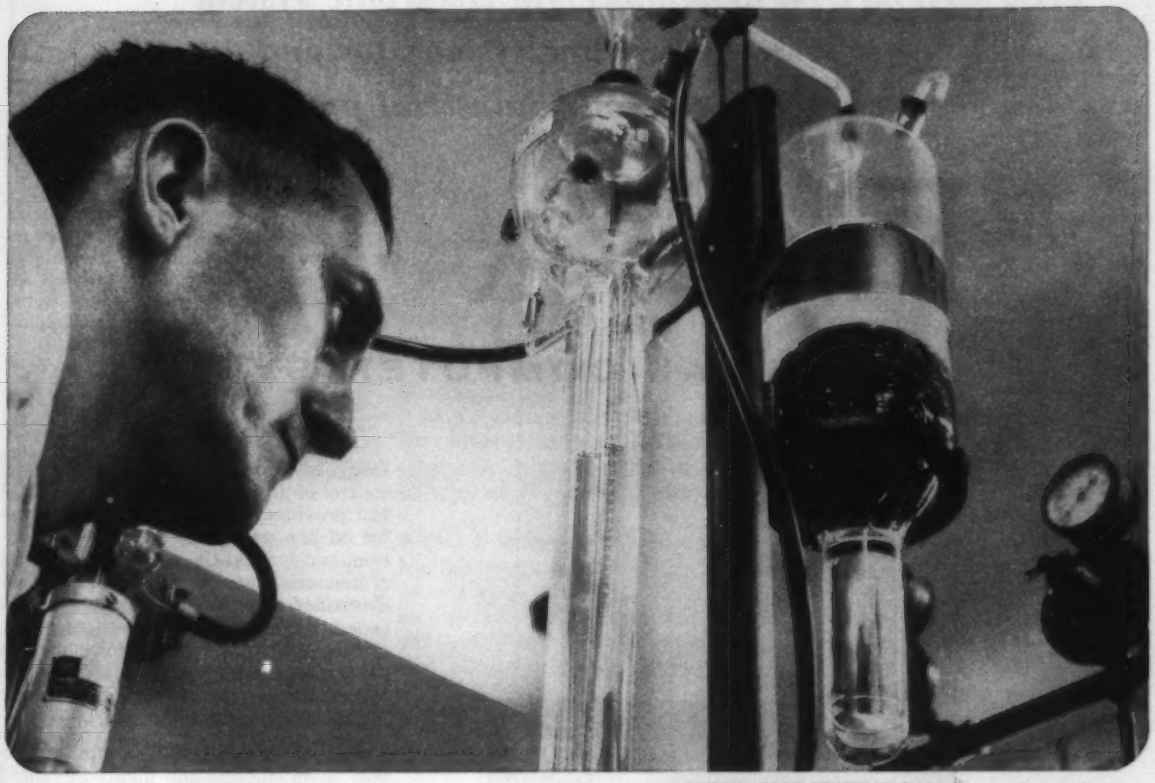
William C. Bruckman, 50, chief engineer of **O'Keefe & Merritt Co.,** died recently in Whittier, Calif.

Merle F. Koblish, 54, sales manager, General Chemical Div., **Allied Chemical Co.,** died May 1 in Morristown, N. J.

David C. Park, 77, chairman and former president, **Smith & Caffrey Steel Co. Inc.,** Syracuse, N. Y. died Apr. 25.

Kenneth L. Guse, 48, works manager, **La Salle Steel Co.,** Chicago, died May 8.

***Experience**—the added alloy in **Allegheny Ludlum** tool steels*



QUICK, FAST TESTING for carbon content is done not once or twice but 8 times per melt in A-L's Chem Lab with this direct reading Leco carbon determinator.

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Lab tests for carbon eliminate your guesswork; provide high hardness, uniform hardenability, reproducible tool performance.

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Carbon control at Allegheny Ludlum assures you of precise response to heat treating. This control in the melt brings you predictable, *high hardness, uniform hardenability* and *reproducible tool performance.*

This is just one of the many things A-L does to insure high quality. Here are some others: close control over forging techniques, rigid temperature-time programming, careful testing of billets prior to processing to insure good surface and sound interior, control over annealing to give you the right hardness for your exact machining operation, thorough metallurgical testing to insure top tool steel quality and meeting of your specifications.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest A-L representative; you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

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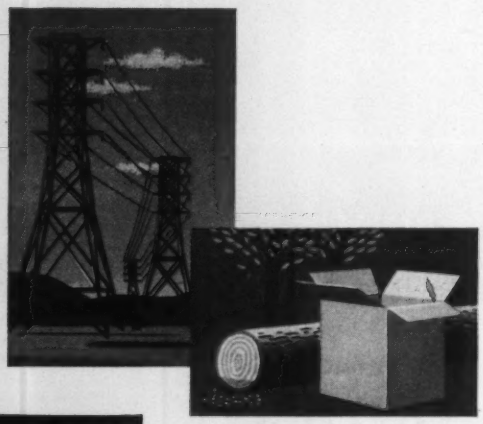

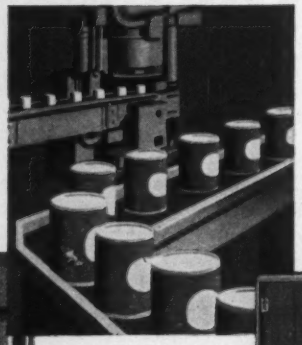

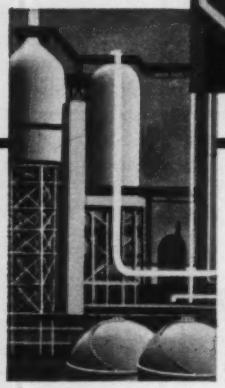

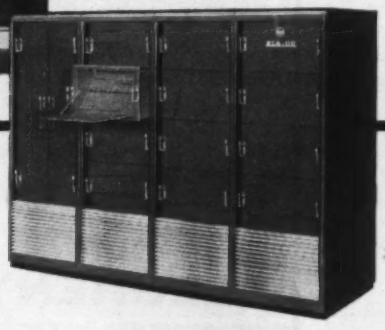

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NOW — computer logic accepts decimal or binary information; powerful instruction code provides complete flexibility including automatic priority handling of control functions

NOW — high speed computation, with fast random access core memory in combination with 3600 rpm memory drums, results in highly effective overall system speed

NOW — expansibility, in natural stages of process-control development, economically implemented by "building block" concept

NOW — all transistor, printed circuit construction assures highest reliability. Diagnostic routines for self-checking, *during operation*

NOW — easy maintenance with plug-in components and slide-out sub-assembly drawers. Serviceable during operation. Rugged, heavy-duty construction; cabinet may be pressurized. Does not require external air conditioning.

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Armco Steel Modernizing Hamilton, Ohio, Plant

ARMCO STEEL CORP., Middletown, Ohio, has launched the largest modernization and rebuilding program ever to be undertaken at its Hamilton, Ohio, plant. Total cost of all projects in the program will be more than $6 million, says C. G. Davies, vice president and general manager, Armco Div.

Major projects underway include the dismantling and rebuilding of coke oven battery No. 1 and the relining of No. 2 blast furnace.

• **No. 1 Battery**—Cost of rebuilding the coke oven battery from the ground up is about $4 million. The largest battery at the Hamilton plant, it was first put into operation in April, 1928. From that time until April, this year, 13.25 million tons of coal were charged into the battery. When rebuilt, battery No. 1 will have the same number of ovens as before, 45.

Rebuilding of the battery is expected to be completed in April or May, next year. While the work is underway, battery No. 2 (15 ovens) and batteries No. 3 and 4 (25 ovens each) will continue to produce coke.

Batteries No. 2 and 3 were recently put back into operation after being shut down for six months for modernization. New self-sealing doors were installed on these ovens and new door machinery placed in operation at a cost of $875,000. Battery No. 4 was built in 1948 and has these modern features.

Upon completion of this project, the Hamilton coke plant will have the features of a completely new coke plant. Doors on all 110 ovens will be handled by the same type of door machines. Two new coal charging cars will be added. Koppers Co. Inc., Pittsburgh, has the contract for the coke plant work.

• **No. 2 Blast Furnace**—Relining of the furnace will cost close to $1 million. The job was started in mid-April and is nearing completion. International Chimney Corp., Buffalo, is doing the brickwork.

The former lining in No. 2 blast furnace was installed in June, 1954, or about six years ago. In addition to the relining, normal maintenance work is being done on the furnace. No. 1 blast furnace was relined last fall.

• **Water Softening Unit**—A $265,000 unit is being installed at the Hamilton plant to treat raw well water for use as blast furnace cooling water and boiler water. Chemical treatment of the water will reduce scaling and corrosion in blast furnace and boiler piping. Infilco Inc., Tucson, Ariz., has the contract for the treating equipment and McGraw Construction Co. Inc., Middletown, Ohio, has the erection subcontract.

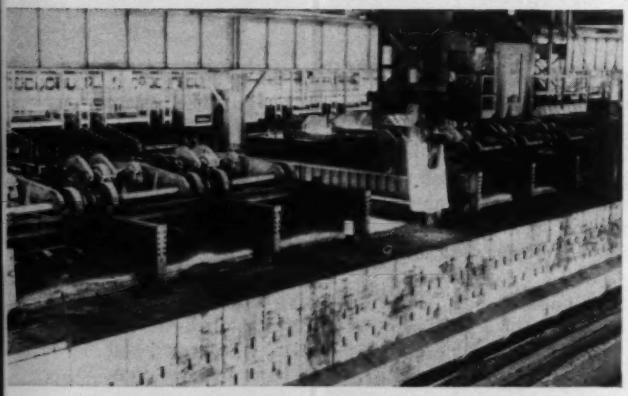
Foreign Pacts Signed

The list of technical assistance, licensing, marketing, and other similar agreements between U. S. and foreign companies is growing. These have been announced recently:

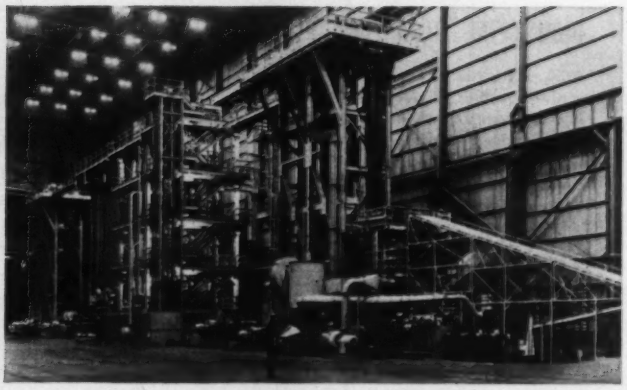
• **Borg-Warner Corp.**—This Chicago firm has acquired through a wholly owned Australian subsidiary 25.4 per cent interest in Ralph McKay Ltd., an Australian manufacturer of implement parts. Borg-Warner will provide the Australian company with technical knowhow and assistance in the manufacture of agricultural implement parts, wheels, and other allied products. The McKay plant in Melbourne, Australia, will be converted almost completely to automation with the assistance of Borg-Warner's Ingersoll Products Div., Chicago.

• **Thompson Ramo Wooldridge Inc.**—This Cleveland firm and Industrias Kaiser Argentina (IKA), an affiliate of Willys Motors Inc., have formed Productos Thompson Argentina to manufacture valves and other automotive parts for the Argentine automotive industry. A plant will

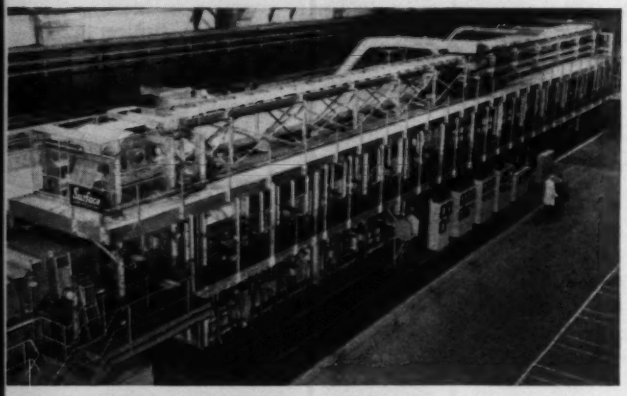
(*Please turn to Page* 84)



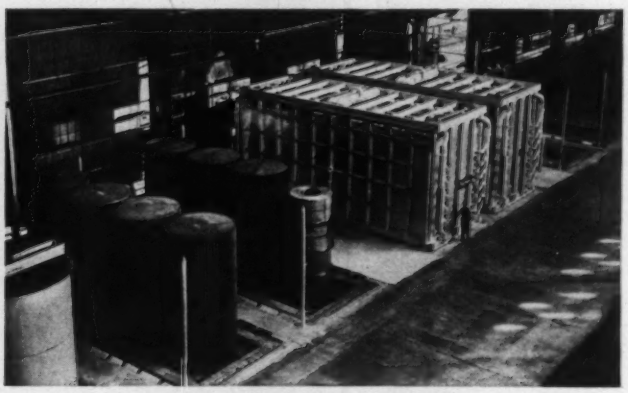
48 soaking pits installed at one time.



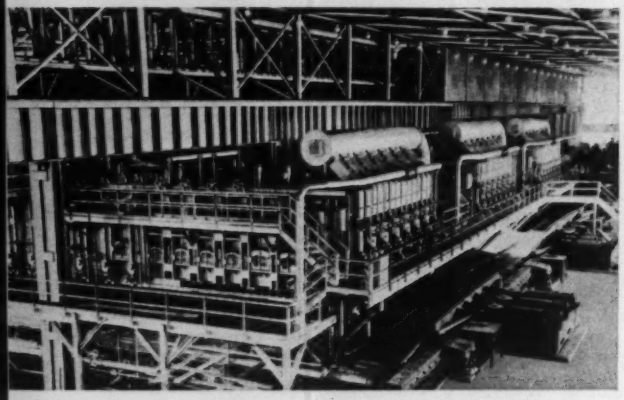
Continuous tin plate annealing line.



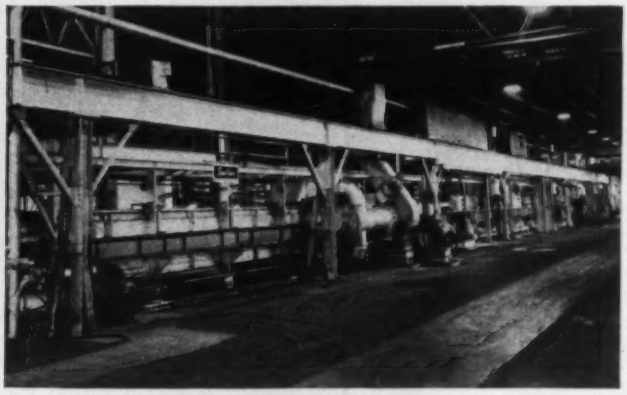
Normalizing line for enameling strip.



Multiple-stand annealing covers.



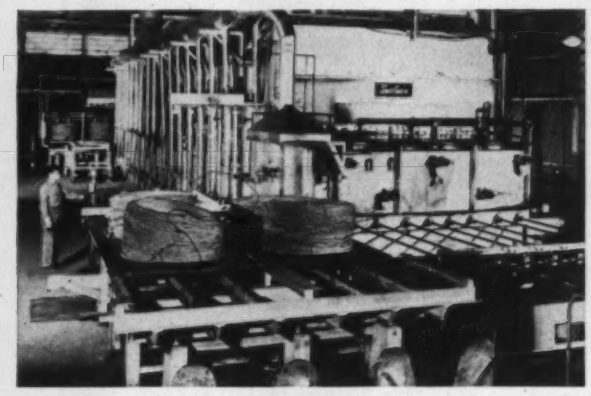
World's largest slab-heating furnaces.



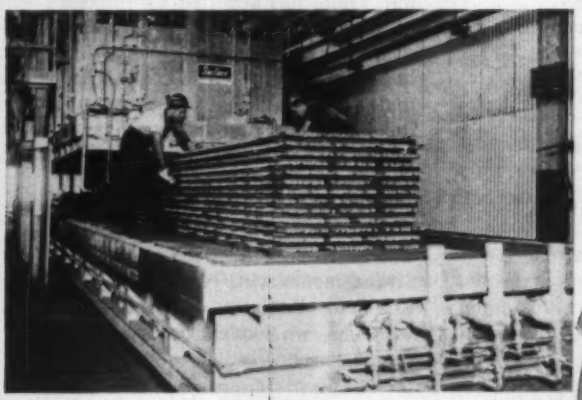
Continuous strip galvanizing line.

Worldwide engineering and manufacturing facilities through associates in Australia

Single-stand radiant tube annealers.



Annealing, carbon restoration furnace.



Car-bottom rod and bar furnace.

PROVING GROUNDS

for steel profits

Surface Combustion's proving grounds—a few of which are shown at the left—include virtually every rolling mill in North America plus a considerable number abroad.

You can sample here the variety of Surface equipment which has passed the toughest tests on the steel mill floor: checked out for quality, shaken down for reliability, and—most important to you—proved out for profitability.

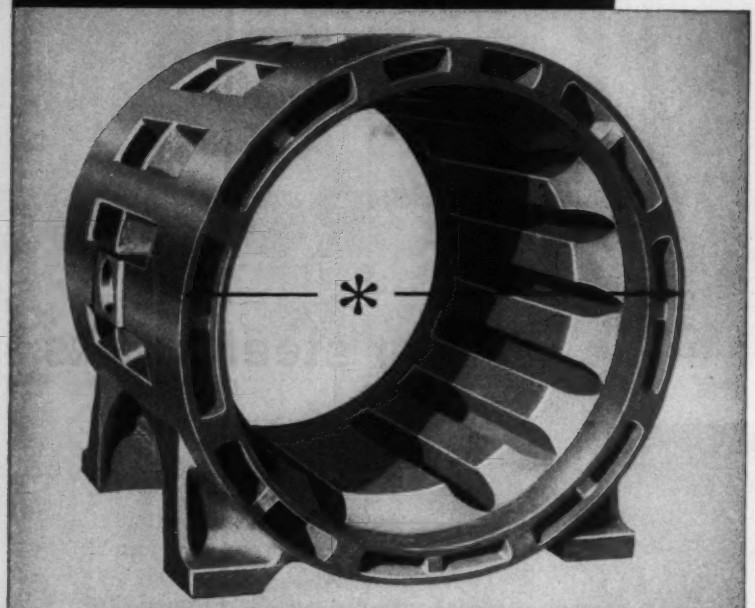
With internal costs and external competition on the rise, it will pay you more than ever before to specify the services and equipment of a company which has repeatedly passed the tests in steelmaking's ultimate proving grounds. Surface Combustion, 2408 Dorr Street, Toledo 1, Ohio.

A division of Midland-Ross Corporation

Surface

Belgium • France • Germany • Great Britain • Italy • Japan

URICK'S DUCTILE IRON



Courtesy RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, O.

MOTORS . . . . from the Lakes to the Sea

This 1300-pound URICK casting (a fan cooled motor stator frame made to Navy specifications) will withstand extra stress and strain and has better corrosion resistance because it is Ductile Iron. URICK recommends and successfully casts Ductile whenever greater tensile strength and higher impact value are of prime consideration because it has most of the advantages of steel, yet because of its high molten fluidity, it will take intricate shapes not possible with other high strength metals. Other advantages are—Ductile castability permits weight reduction while maintaining required physical properties . . . superior machinability reduces machining time and consequently results in longer tool life. There are other advantages and economies to Ductile when recommended, engineered, and cast by URICK, ask about them.

**This fan cooled motor stator frame to US NAVY specifications is cast in 16 different sizes from 16" to 42".*

Send for Bulletin on URICK's Ductile . . . ask for catalog on URITE gray iron and URICK's facilities, too! Remember, URICK starts with 'U.'

URITE CASTINGS

URICK FOUNDRY

ERIE, PENNSYLVANIA

LICENSED UNDER PATENTS OF THE INTERNATIONAL NICKEL COMPANY., INC.

(*Concluded from Page 81*)

be built at Santa Isabel, just outside Cordoba, where IKA operates an automotive plant.

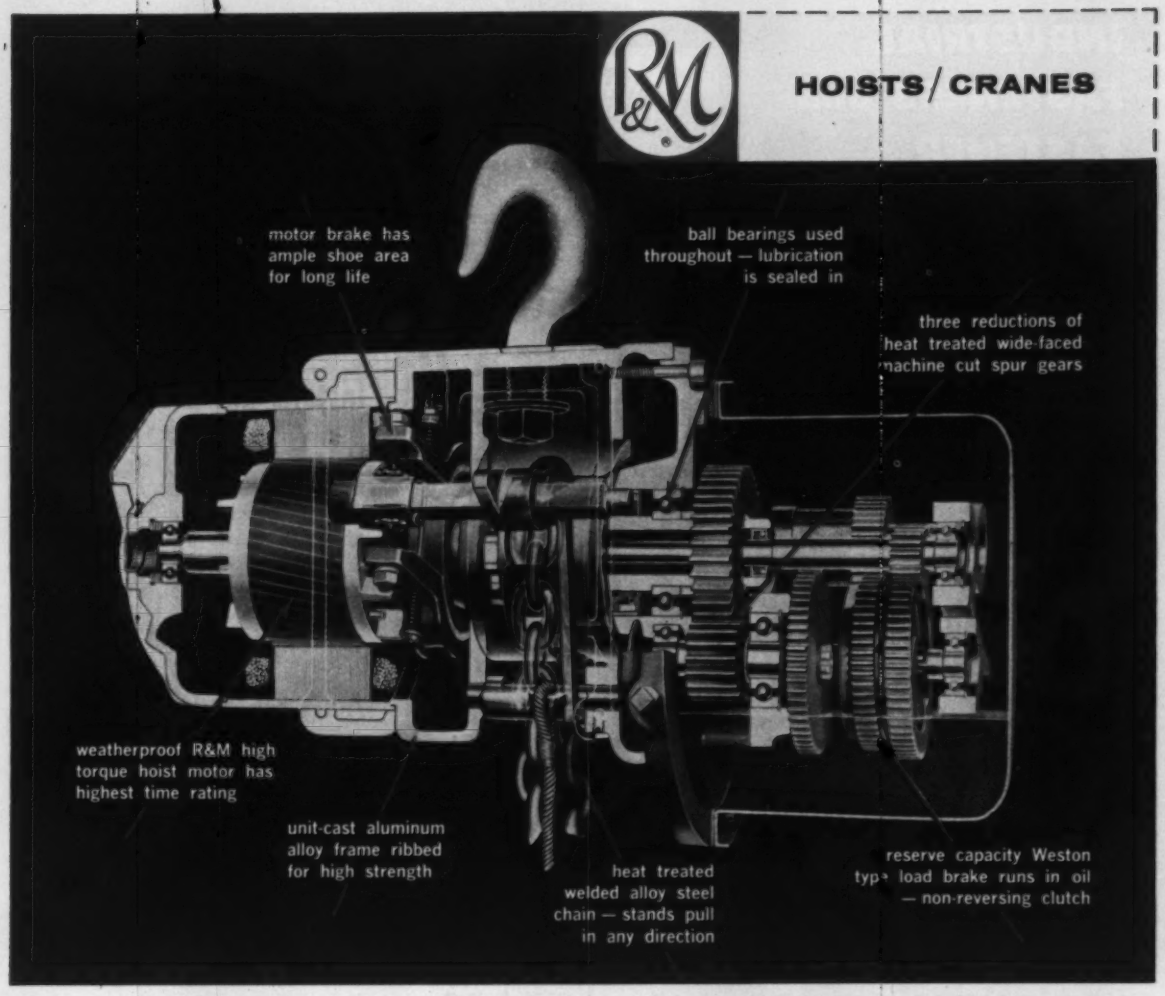
• **Chemetron Corp.**—This Chicago firm is acquiring Clyde Tube Forgings Ltd., Glasgow, Scotland, manufacturer of welding fittings for industrial piping and pipeline transportation systems. Tube Turns Div., Chemetron Corp., Louisville, will co-ordinate Clyde Tube's operations with its own. W. G. Conner Jr. will serve initially as managing director of Clyde Tube Forgings' Glasgow plant and sales organization.

• **National Lead Co.**—This firm's Doehler-Jarvis Div. at Toledo, Ohio, has established a Brazilian subsidiary offering complete diecasting and plating facilities. The new firm is Industrias Doehler do Brasil SA, Caixa Postal 910, Sao Paulo, Brazil. It is jointly owned by National Lead and Companhia Industrial e Commercial Brasmotor, Sao Paulo. The plant in Sao Bernardo do Compo is equipped with facilities for casting and finishing diecast parts in alloys of zinc, aluminum, and magnesium. The plant is also equipped for production of assemblies utilizing diecast as well as purchased parts.

• **Dayton Rubber International**—This division of Dayco Corp. (formerly Dayton Rubber Co.), Dayton, Ohio, has acquired an interest in Citla SA, Mexico City, Mexico. A long term technical assistance and licensing agreement has been signed under which Citla is manufacturing automotive and industrial belts. Modern equipment is en route to double existing production facilities.

• **Skidmore-Wilhelm Mfg. Co.**—This Cleveland firm has completed arrangements with North Bar Tool Co. Ltd., Banbury, England, that will add two models to its line of torque tension testing equipment.

• **Ransome Co.**—This Scotch Plains, N. J., firm's standard line of positioners, turning rolls, welding head manipulators, and other welding products will be manufactured in France by Petro-Fouga Co., Paris. The French firm makes heavy boiler and pressure vessels, well drilling


R&M
HOISTS / CRANES
motor brake has ample shoe area for long life
ball bearings used throughout — lubrication is sealed in
three reductions of heat treated wide-faced machine cut spur gears
weatherproof R&M high torque hoist motor has highest time rating
unit-cast aluminum alloy frame ribbed for high strength
heat treated welded alloy steel chain — stands pull in any direction
reserve capacity Weston type load brake runs in oil — non-reversing clutch

HOIST RUGGEDNESS AT ITS BEST

Robbins & Myers Type JC chain hoists are the kind you need for heavy service over bruising loads. At prices fully competitive, they incorporate extra-husky features that withstand continual punishment. Here are some of the points of superiority that can go to work for you: R&M high-torque hoist motor has the highest time rating found in any hoist–30 min., 55° C. Weatherproof construction locks out moisture. Two brakes guard the load–a Weston type load brake has reserve capacity and a shoe type motor brake lets you spot loads cleanly and accurately. Sealed, weatherproof controls operate by rope. Type JC hoists are stocked near you for immediate delivery. Features and options: portable, 10 foot lift, hook mounting or push trolley, capacities – 500, 1000, and 2000 lbs. Request Bulletin 852-B from the Hoist & Crane Division, Robbins & Myers, Inc., Springfield, Ohio or Brantford, Ontario.

ROBBINS & MYERS

hoists & cranes, Moyno® pumps, motors, Propellair® fans

INDUSTRIAL FASTENERS and FASTENER SPECIALTIES
Immediate delivery...
BAYONNE SINCE 1912
CAP SCREWS from 1/4" to 2" dia.
STUDS from 3/8" to 3" dia.
HIGH TENSILE BOLTS from 5/8" to 1-1/4" dia.
U-BOLTS from 3/8" to 3" dia.
LAG BOLTS from 1/4" to 1-1/4" dia.
COUNTERSUNK HEAD BOLTS from 1/2" to 1-1/4" dia.
CARRIAGE BOLTS from 3/16" to 1" dia.
MACHINE BOLTS from 1/4" to 4" dia. to any length
BUTTON HEAD BOLTS from 1/2" to 1-1/4" dia.
Hot Dip Galvanized or Black
Made of Steel or Genuine Wrought Iron to your specifications
BAYONNE BOLT & NUT CORPORATION
WORKS & GENERAL OFFICE: BAYONNE, N. J.
232 West 2nd St., Bayonne, N. J.

Take Your Pick

OF THESE BROOK A.C. MOTORS

THE Open Drip Proof NEMA Rerate Motor occupies less space—weighs 12 to 15% less than the Open Drip Proof Motor in the old frame. This is no case of "Riding horse versus draft horse"—both motors have equal stamina. Some prefer the old frames, especially where space is no factor. Brook warehouses coast-to-coast carry both types in stock. You can't find a better motor at any price, yet Brook Motors cost substantially less, because of volume production, modern techniques, world-wide distribution and a realistic pricing policy. Brook Motors available from 1 to 600 H.P. All standard enclosures. Write for literature and name of your Brook Dealer.

world's most respected motor

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In Canada: Brook Electric Motors of Canada Ltd., 250 University Ave., Toronto, Ont.

SINCE 1904 BROOK MOTOR CORPORATION

equipment, transportation equipment, and also specializes in construction of structural steelwork and other engineering for oil refineries and petrochemical installations.

• **Lobeck Casting Processes Inc.**—This New York firm has signed a marketing agreement with Sheppard & Sons Ltd., Bridgend, South Wales. Lobeck can now offer its customers Sheppard ingot and pig casting machines.

Installs Extrusion Press

Reynolds Metals Co., Richmond, Va., will install a 4000 ton aluminum extrusion press in its Grand Rapids, Mich., plant. The unit is expected to be in production by midsummer, says L. H. Graves Jr., general manager of the Extrusion Div. The press is being built by Lake Erie Machinery Corp., Buffalo.

Adds Metal Lath Facilities

Republic Steel Corp. has completed a $1.5 million program to expand and improve production facilities for metal lath at its Truscon Div., Youngstown. New facilities include equipment for the production of a $\frac{3}{8}$ in. rib lath, a new small mesh diamond lath, and expanded corner bead. A new cold rolled channel machine has been installed to produce plastering channels of uniform dimensions and minimum radius. Dip painting operations have been replaced by spray painting equipment to coat each channel. All the company's metal lath products are being fabricated from coil stock instead of sheets.

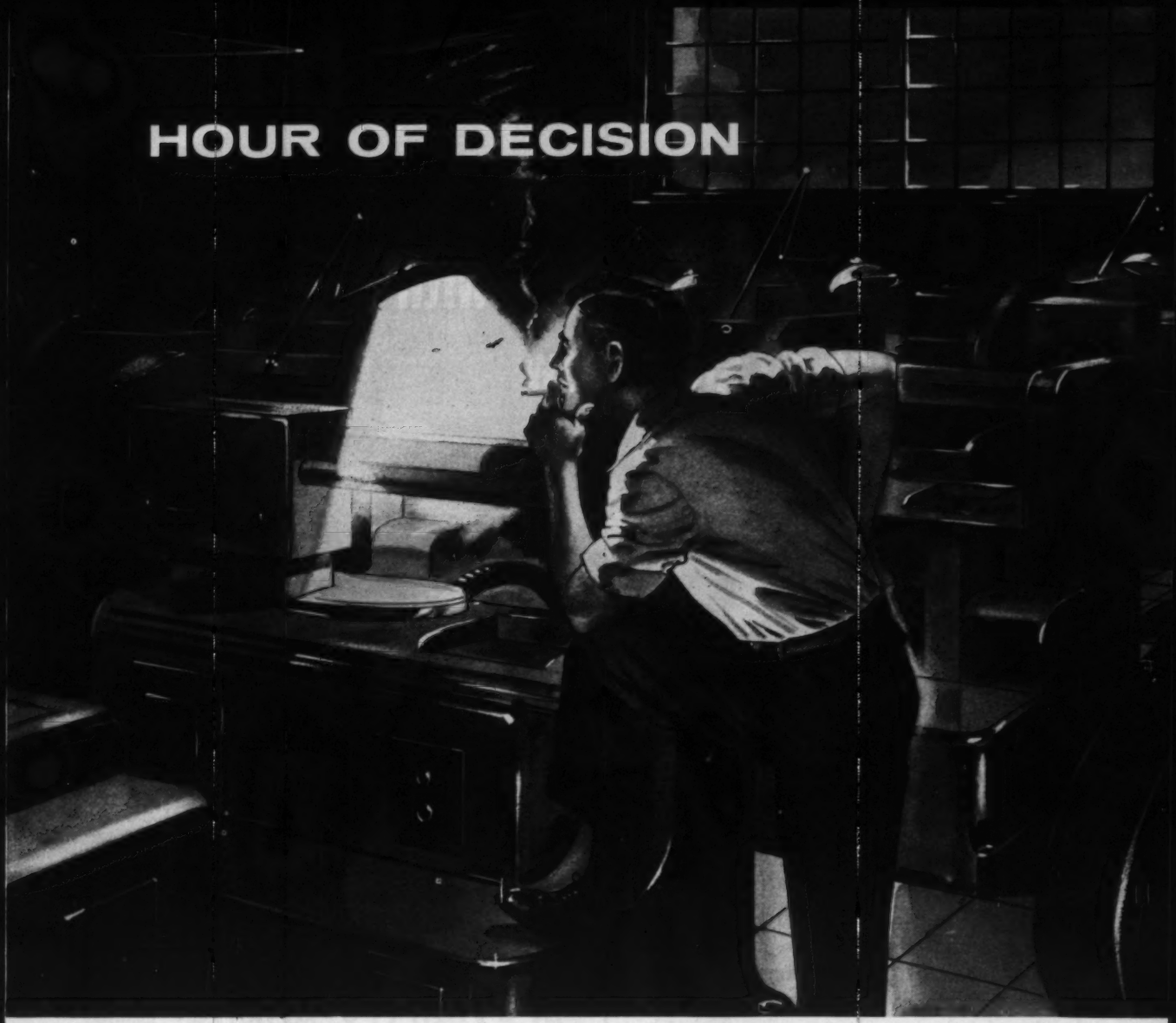
Saskatchewan Gets Plants

Regina, Sask., is growing rapidly as a steel producing and fabricating center.

Interprovincial Steel Corp. Ltd., Regina, has poured the first steel at its $14 million plant. Steel from the electric arc furnace is used for plates, coils, and skelp.

Dominion Bridge Co. Ltd., Montreal, Que., is completing a $1 million fabricating plant near Regina. The plant initially will have an annual capacity of about 6000 tons of fabricated steel, 4000 tons of reinforcing steel, and 1000 tons of other steel products. The plant is the first

HOUR OF DECISION



IS THIS YOU? How many times, after the call bell stops clanging, the customers stop phoning, and people stop asking questions, do you walk into the quiet shop to face up to the really vital decisions?

"How can we compensate for the rising costs of materials, overhead, payroll, maintenance?" "How can we keep producing the exacting tolerances, finishes, and quality our markets are demanding?" "How can we improve our production efficiency so that our narrow profit margin will not disappear altogether?" "How can we meet and beat the increasing world-wide competition in our field?"

One proved answer to these questions is the logical replacement of obsolete, inefficient machines. THE MACHINE TOOL EXPOSITION — 1960 will back up this fact with 11 acres of the latest developments in machine tools. Can you afford to miss seeing new, faster machine tools that will produce more efficiently . . . new, better methods that will cut satisfying chunks out of metalworking costs . . . new, ingenious ideas that will help you produce more quality for less cost?

Tool-up for the Sixties. Plan *now* to attend the largest, single-industry exposition ever held in the United States. Have your key personnel on hand, too. It's a once in five years chance to examine the latest technological advancements in automation through numerical controls and see why Modern Machine Tools = Production Efficiency!

Also see the PRODUCTION ENGINEERING SHOW on the Navy Pier. One registration covers both.

FORMULA FOR TOMORROW

MODERN MACHINE TOOLS = PRODUCTION EFFICIENCY

International Amphitheatre
Chicago, Illinois
Sept. 6-16

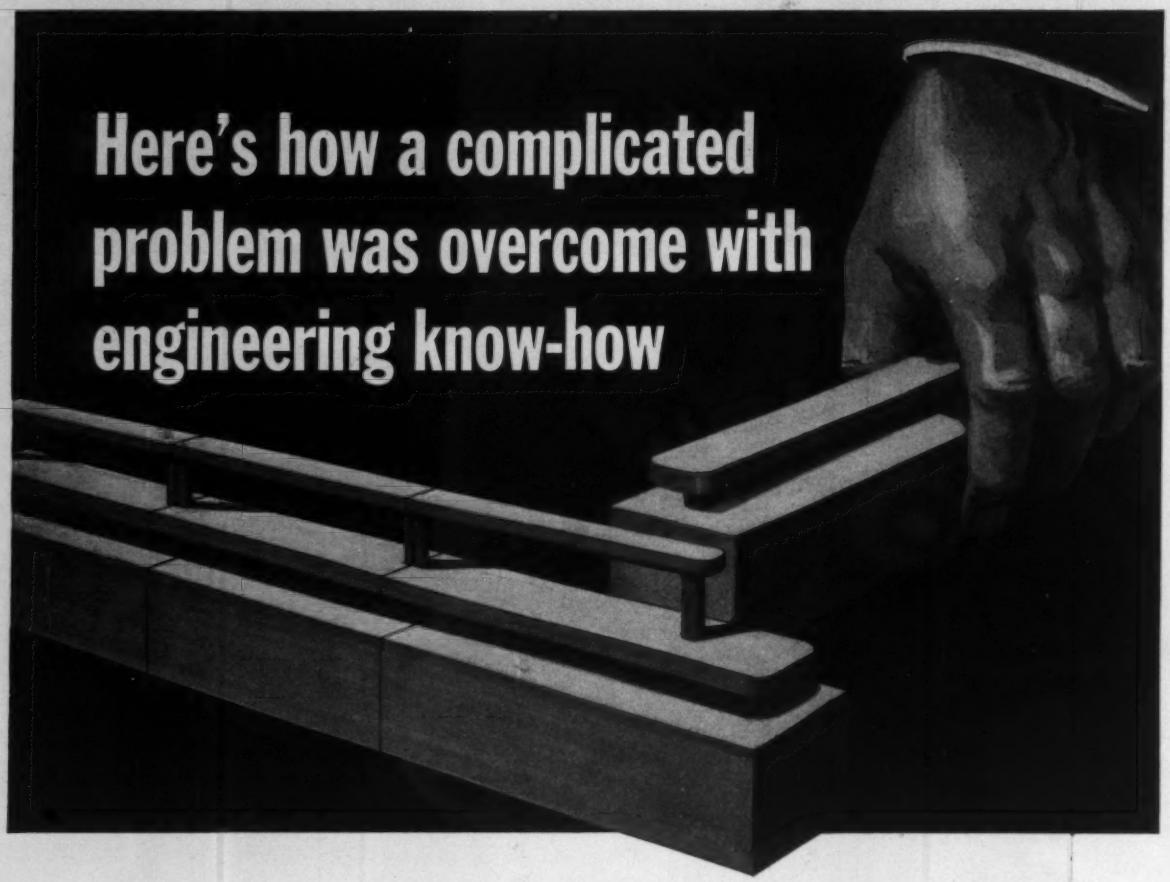
THE MACHINE TOOL EXPOSITION – 1960

For information write to

NATIONAL MACHINE TOOL BUILDERS ASSOCIATION

2139 Wisconsin Avenue, N.W. • Washington, D. C.

Here's how a complicated problem was overcome with engineering know-how



UDYLITE HAD THE ANSWER

PROBLEM: To adapt a full automatic plating machine to the Udylite Bi/Nickel process, which required the addition of an extra nickel plating operation for deposit of semi-bright nickel immediately preceding full bright nickel plate. It was also desirable to gain versatility so the full automatic could be used for either straight bright nickel or the Bi/NICKEL process.

LIMITATIONS: Plant length prohibited the extension of the existing machine at either end.

THE UDYLITE ANSWER: A semi-automatic machine was added at right angles to the existing full automatic. A simple transfer system was engineered and built to "detour" parts through the semi-bright process in the new semi-automatic machine and back to the full bright process in the automatic.

FLEXIBILITY BONUS: Easily accomplished conversion changes the machine to the Bi/NICKEL plating process or reverses it back to its original cycle for single bright nickel plating.

Udylite engineering ingenuity here proved that it is possible to take advantage of the latest new process developments with inexpensive machine change-overs. You'll find it worth investigating—see your Udylite man now or write directly to—

the udylite

world's largest plating supplier

corporation • **Detroit 11, Michigan**

on the west coast: the L. H. Butcher Company

stage of a $10 million to $12 million expansion program by the company in the Regina area.

Organizes Metal Firm

Richard Follansbee has organized Richard Follansbee Inc., Pittsburgh, to deal in new and scrap nonferrous metals and residues. The firm will serve steel manufacturers, foundries, and heavy industry in Pennsylvania, Ohio, and West Virginia.

ASSOCIATIONS

American Zinc Institute Inc. is occupying new and larger offices at 292 Madison Ave., New York 17, N. Y. John L. Kimberley is executive vice president.

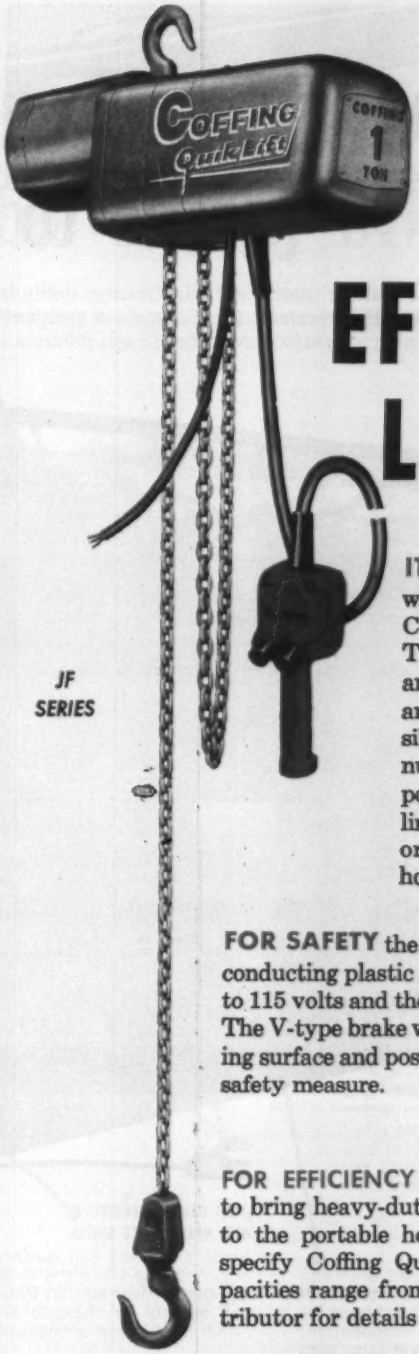
Copper & Brass Warehouse Association, Philadelphia, installed these officers: President, Norman Rosow, New York Brass & Copper Co. Inc., New York; vice president, G. C. Anderson, Fullerton Steel & Wire Co., Chicago; secretary, J. H. Roberts Jr., Edgcomb Steel of New England Inc., Milford, Conn.; and treasurer, F. S. Langsenkamp, F. H. Langsenkamp Co., Indianapolis. T. A. Fernley Jr. is executive secretary.

American Foundrymen's Society, Des Plaines, Ill., elected these officers: President, N. J. Dunbeck, International Minerals & Chemical Corp., Skokie, Ill.; and vice president, A. L. Hunt, Superior Foundry Inc., Cleveland.

V. W. Heimberger, American Steel & Wire Div., U. S. Steel Corp., Cleveland, has been elected the first chairman of the newly organized **Wire & Cable Division of National Electrical Manufacturers Association,** New York. H. W. Clough, Belden Mfg. Co., Chicago, has been elected vice chairman.

C. E. Herington, Herington Advertising Inc., New Rochelle, N. Y., has been appointed secretary-treasurer of the **Foundry Facings Manufacturers Association.** He also acts as executive secretary for the Metal Treating Institute and the Ultra-

(*Please turn to Page* 92)



JF SERIES

EASY
SAFE
EFFICIENT
LIFTING!

IT'S EASY to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The pistol-grip control station and the combination strain cable and control cord makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

FOR SAFETY the control station is made of nonconducting plastic in which the voltage is reduced to 115 volts and the push-buttons are interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety measure.

FOR EFFICIENCY this hoist has been designed to bring heavy-duty performance plus durability to the portable hoist field. It will pay you to specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

COFFING HOISTS

DUFF-NORTON COMPANY

813 Walter Street • Danville, Illinois

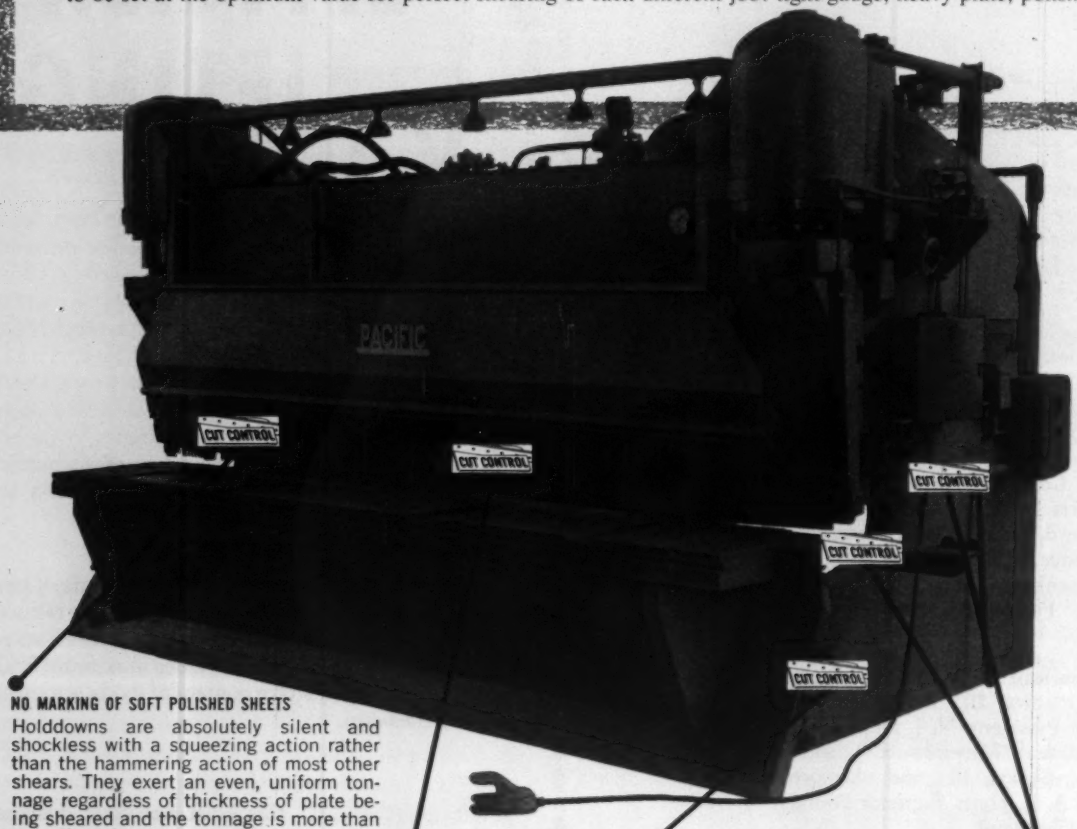
COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

CUT CONTROL adjustments to do jobs that

Unlike conventional shears that are limited in their shearing ability because they are permanently set without possible adjustment, PACIFIC features *Cut Control*—a group of adjustments which permit all controls to be set at the optimum value for perfect shearing of each different job: light gauge, heavy plate, polished



NO MARKING OF SOFT POLISHED SHEETS

Holddowns are absolutely silent and shockless with a squeezing action rather than the hammering action of most other shears. They exert an even, uniform tonnage regardless of thickness of plate being sheared and the tonnage is more than any other shear.

"INSURED" POSITIONING OF PLATES

For precision shearing, holddowns advance and positively grip plate independently of upper knife movement allowing operator to check for exact alignment (with aid of cut illumination) before shearing. All cuts are good cuts with PACIFIC.

LIGHT GAUGE SHEARING WITH HEAVY PLATE SHEAR

Knife clearance can quickly be adjusted over twice the range of any other shear so that PACIFIC can quickly be changed to cut either light gauge or heavy plate.

READILY SET UP FOR SLITTING

Depth of stroke readily adjusted so knives do not completely cross in slitting. This permits plates to be lined up with slitting attachment. Deep throats permit wide strips to be slit.

"CUSHIONED" SHEARING OF BRITTLE ALLOYS—Hydraulic power exerts smooth uniform shearing force cushioned against initial cutting shock and break-through shock. Rake angle readily adjusted for optimum setting to minimize or eliminate shock • HEAVIEST DUTY SHEAR—PACIFIC is designed for heavy duty continuous mill type service. It has more holddown tonnage, more horsepower and more weight in the actual stress bearing frame than any other shear. Customers report cutting full capacity stainless steel regularly • SAFEST SHEAR—Hydraulic system completely protected against deliberate or accidental overload. Shearing action can be stopped instantly in emergency by operator releasing foot pedal • LONGEST KNIFE LIFE—Customers report from 3 to 8 times longer knife life than mechanical shears. Knives cushioned against

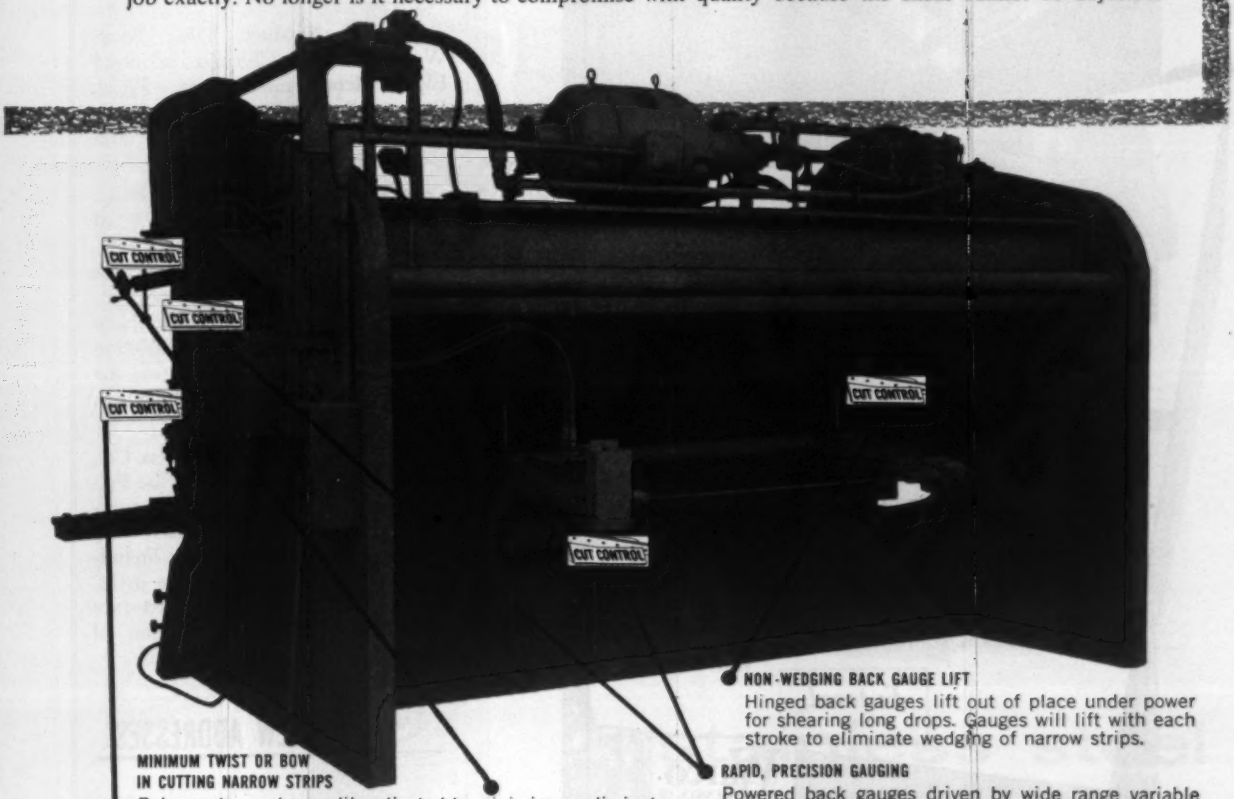
Write for brochure

PACIFIC INDUSTRIAL MANUFACTURING COMPANY

848 49th AVE., OAKLAND, CALIF. • PLANTS: OAKLAND, CALIF. and MT. CARMEL, ILL.

enable PACIFIC Hydraulic Shear are impossible on any other shear

stainless, soft aluminum, brittle alloys, long narrow strips, high speed cycling for high production, extreme accuracy for precision work, perfect mark-free edges. For the first time a shear can be controlled to fit the job exactly. No longer is it necessary to compromise with quality because the shear cannot be adjusted.



NON-WEDGING BACK GAUGE LIFT

Hinged back gauges lift out of place under power for shearing long drops. Gauges will lift with each stroke to eliminate wedging of narrow strips.

MINIMUM TWIST OR BOW IN CUTTING NARROW STRIPS

Rake angle can be readily adjusted to minimize or eliminate twist and bow in light materials. Even full capacity plate can be sheared at less rake angle than on other shears.

RAPID, PRECISION GAUGING

Powered back gauges driven by wide range variable speed hydraulic motor for rapid positioning with smooth deceleration to precise inching speed. Anti-friction ball screws; heavy single gauging bar; powered gauges controlled and indicated from front of shear.

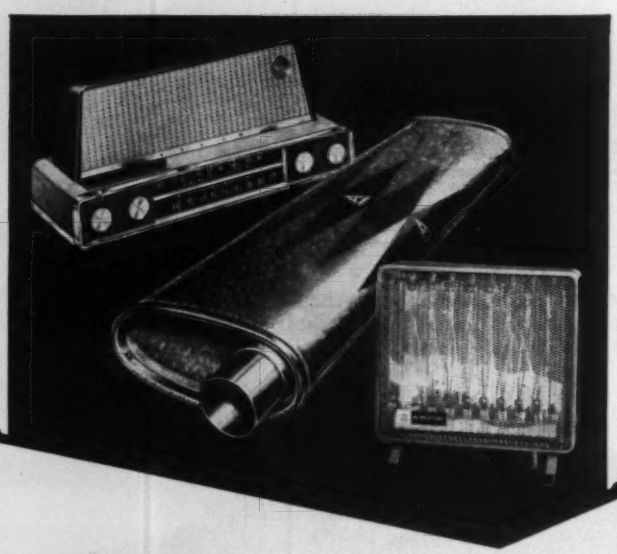
HIGH CYCLING SPEED FOR HIGH PRODUCTION

PACIFIC has been designed to cycle as fast as an operator can feed it. Lineal speed of the ram has been selected at the optimum speed for maximum knife life and safety. Cycling speed is attained by shortening the stroke to the minimum permissible for each job thereby eliminating all wasted motion. In light gauge shearing of full length pieces, rake angle may also be reduced to further shorten the required stroke. In shearing small pieces or sheets that are less than the full length of the shear, the stroke can be shortened to the length of the sheet so that the upper knife returns upward immediately after completing the cut. Light strips can be sheared at rates up to 70 strokes per minute.

shock, protected against overload, uniform shearing speed through cut • NOISELESS OPERATION, QUIETER THAN A SEWING MACHINE—By completely eliminating usual loud, shattering noise through cushioned shockless shearing, PACIFIC has promoted measurable increase in efficiency of plant and office workers. No interference with adjacent electronic burning and gauging equipment • LOWEST MAINTENANCE—No wearing parts such as clutches, gears, bearings, brakes. All moving parts run in filtered oil. Only maintenance items are a few standard solenoids, relays, microswitches and yearly oil changes • HUNDREDS OF DOLLARS OF SAVINGS IN FOUNDATION COST—Foundation required to resist only dead weight and insure proper line-up. It need not resist heavy shocks, hammering and twisting of mechanical shear.

DISTRIBUTORS:

ALBUQUERQUE, N. M.; DENVER, COLO.—R. E. Dubac Associates • ARIZONA; LOS ANGELES AND BURLINGAME, CALIF.; NEVADA—Tornquist Machinery Company • ATLANTA, GA.—J. R. Carlson Machinery Company • CHICAGO, ILL.—L. G. Evans & Company • CLEVELAND, OHIO—T. R. Wigglesworth Machinery Dist. • DAVENPORT and DES MOINES, IOWA; KANSAS CITY and ST. LOUIS, MO.; OKLAHOMA—Moehlenpah Engr. Inc. • DETROIT, MICH.—Taylor Thompson Machinery Company • DALLAS, TEXAS—Machine Tool Associates • HOUSTON, TEXAS—Butcher-Carter-Preston • INDIANAPOLIS, IND.; LOUISVILLE, KY.—H. B. Green Mch. Co. • MOUNT VERNON, N. Y.—Wm. Halpern & Co. • MILWAUKEE, WIS.; MINNEAPOLIS, MINN.—Gute Company • NORFOLK, VA.; KNOXVILLE, TENN.—Tidewater Supply Co. • NEW ORLEANS, LA.—Dixie Mill Supply Co. • PITTSBURGH, PA.—Howard Canning • PORTLAND, ORE.—Portland Machinery Company • ROCHESTER, N. Y.—Ogden R. Adams Co., Inc. • SALT LAKE CITY, UTAH—Todd Machinery Company • SEATTLE, WASH.—Buckner Weatherby Company • WASHINGTON, D. C.; WYNNEWOOD, PA.; MARYLAND; DELAWARE—Edward A. Lynch Machinery Co. • WETHERSFIELD, CONN.—Beisel Machinery Company • ORLANDO, FLA.—J. R. Carlson Machinery Company • TORONTO, ONT.; CANADA—Hercules Presses Ltd.



at Arvin Industries, too...

FEDERAL-WARCO

High volume producers of precision metal products, Arvin Industries consistently get highest quality welds with Federal Multi-gun, automatic resistance welders.

Arvin quality control experts, like those of other leading metal fabricators across the country, know they can rely on Federal resistance welders and Warco mechanical presses to maintain quality and still meet highest production quotas. Precision-engineered to your requirement by:

THE FEDERAL MACHINE AND WELDER COMPANY
Warren, Ohio

Federal® WELDERS

Warco® PRESSES

Federal #58W268 Multi-gun resistance welder in action on Arvin muffler parts.

(*Concluded from Page 89*)

sonic Manufacturers Association. The Herington organization also functions as the creative agency for much of the sales promotion program of Crucible Steel Co. of America, Pittsburgh.

CONSOLIDATIONS

Ingersoll Products Div., Borg-Warner Corp., Chicago, acquired **Elgin Metalformers Corp.**, Elgin, Ill., supplier of metal modular type enclosures to the electronic and communication industries.

Crane Co., Chicago, purchased the fixed assets and inventory of the **General Air Conditioning Corp.**, Los Angeles, manufacturer of heat pumps, reverse cycle air conditioners, and kitchen equipment. The firm will be operated as a division of Crane's Plumbing-Heating-Air Conditioning Group, Johnstown, Pa.

Bay State Abrasive Products Co., Westboro, Mass., purchased the **Felker Mfg. Co.**, Torrance, Calif., manufacturer of diamond abrasive cutting wheels and machines, including cutoff, lapping, and core drills. The property will be operated as a subsidiary under the direction of Elden L. Auker, vice president.

NEW ADDRESSES

Luria Bros. & Co. Inc., supplier of scrap iron and steel, relocated its Pittsburgh offices at Two Parkway Center, 875 Greentree Rd., Pittsburgh, Pa. Luria will share about 5000 sq ft of space with its subsidiary, Southwest Steel Co.

ALCO Products Inc., Schenectady, N. Y., moved its New York City executive and sales offices to 530 Fifth Ave., New York 36, N. Y.

Linde Co., a division of Union Carbide Corp., moved its advertising department to 270 Park Ave., New York 17, N. Y.

Daystrom Inc., Murray Hill, N. J., will move its Weston Instruments Div., West Englewood, to Poughkeepsie, N. Y., by early June.

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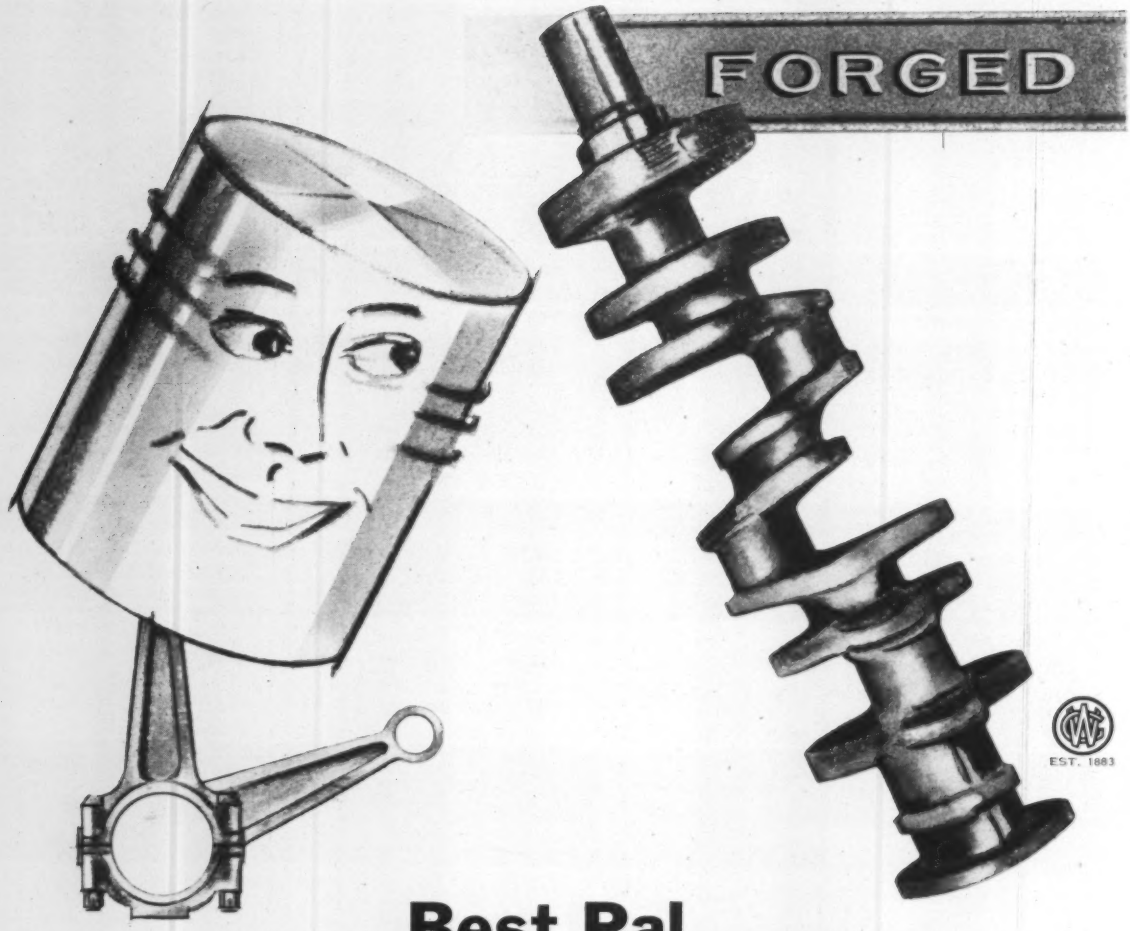

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L-D PROGRESS NOTE— Engineers at Kaiser Refractories & Chemical Div., Kaiser Aluminum & Chemical Corp., Oakland, Calif., report a new tar bonded refractory for the inner lining of oxygen vessels has set a record for life at the Kaiser Steel Fontana, Calif., plant—30,625 tons of steel in 277 heats before giving out. The firm claims the new brick has whipped the hydration problem that plagued earlier efforts.

TAPE MILEPOST— Numerical control machines have turned out more than 60,000 parts on F-106 fighter planes, says Convair Div., San Diego, Calif., General Dynamics Corp. The firm says it's one of the largest users of such devices.

POWDERED 'TITANILLURGY'—Metal parts of titanium powder can be made with cross sections as large as 35 sq in., says Clevite Corp.'s Mechanical Research Div., Cleveland. Such shapes have the usual advantages attributed to powder metallurgy.

FASTER STAINLESS EXTRUSION—A new manufacturing technique enables H. M. Harper Co., Morton Grove, Ill., to extrude small stainless ingots directly from the cast condition to finished shape, bypassing conventional hot rolling. Development was based on the Ugine-Sejournet glass lubrication process.

BETTER ATOMIC STEELS — Higher strength, lower cost steels for nuclear reactors may result from modifications of chromium-molybdenum steels, says U. S. Steel Corp., Pittsburgh. Such alloys conduct heat well without the expansion of steels in current use, the firm claims, although current formulas lack adequate high temperature strength. Titanium and columbium additions are one answer.

IMPROVED BALANCING MACHINE—A new device balances a wide range of parts without rotating them. Based on an air ball pivot, out of balance parts placed in the holder tilt the device—the amount of tilt is measured with electromagnets that don't interfere with balancing the tilting motion. They're being used in an automatic brake drum assembly balancer at General Motors Corp., Detroit.

CORROSIVE PEOPLE— Some people can produce more rust by touching metal than others, find Drs. William R. Buckley and Charles E. Lewis, Eastman Kodak Co., Rochester, N. Y. They have devised a simple test to screen out such people. It detects high concentrations of chloride ions in those individuals. They'll cause less damage if they: Work in a cool place, drink more water, wash hands more often, and cut down salt intake.

VACUUM ARC COMPETITOR— Temescal Metallurgical Corp., Richmond, Calif., foresees 50 to 60 in. ingots being refined in 15 million watt, electron beam, melting furnaces. "Such sizes should bring present refining costs down to about 20 cents a pound," says Dr. Charles Hunt, vice president. Advantage: Transverse properties of refined alloys are equivalent to longitudinal properties. Theoretically, says Dr. Hunt, there should be no limit on size. It appears to be useful at any processing level you want, whether straight steel or refractory metals are involved.

TOGETHERNESS—A machined steel gear meshed with a urethane-elastomer gear operates quietly, eliminates lubrication problems, and permits broader design tolerances. It will outwear all metal or all elastomer mated parts, says Dr. Herman Mark, Brooklyn Polytechnic Institute.

BEARING LUBE PROGRESS—Extreme service conditions in space put enormous burdens on present lubricants for precision bearings, says Miniature Precision Bearings Inc., Keene, N. H. Tests so far reveal that these lubricants are the best we have: High temperature mineral oils, silicone oil, and silicone oil-grease combinations. (You can get the details in a report published by the firm.)

Tankmaker Builds on

The 250,000 standard cubic foot tank at left contains over four times the capacity of the cylinders shown. National Cylinder Gas Div., Chemetron Corp., reports it can serve this account (Sivyer Steel Casting Co., Chicago) with one third the number of deliveries formerly required

A YOUNG company that has seen its sales dollar volume multiply 30 times since 1957 has found that reliability is the prime factor in determining acceptance by users of cryogenic storage tanks for liquefied gases.

Three measures with respect to optimum operation are cited: 1. Ability of the equipment to produce a vacuum. 2. Ability to hold a vacuum over an extended period. 3. Ability to minimize heat leak through support structures connecting external shell to the inner tank.

Quality control at Ryan Industries Inc., Cleveland, is based on those three points, indicates Robert M. Haas, vice president-sales, engineering, and inspection. Ryan makes cryogenic tanks for storing liquefied gases that range from 30 gallon portable units to 4800 gallon central systems (some installations have run as high as 11,200 gallons).

● **Control Program**—The problems of minimizing heat leak and preventing even microscopic openings for the gas to seep through have led Ryan production men into a tight quality control program.

All incoming material, including the structural sheet metal and the dished heads (for the tank ends) are closely checked for imperfections. Submerged arcwelds that join both longitudinal and circumferential seams are x-rayed.

When the tanks are nearly finished, helium gas is pumped through the system, and an operator uses a mass spectrometer that will find leaks so small that they would pass only one teacupful of air in a year.

● **Trend to Bigger Tanks** — Industrial users of liquefied gases are finding that one large storage tank replacing a whole bank of small cylinders (or even a small tank replacing bottles) lowers operating and/or overhead costs in addition to providing increased convenience, says Mr. Haas.

In his own plant, stored gases are used for welding and torch cutting. In the cutting operation, the foreman used to have to change standard gas bottles six times each day. One of the 30 gallon cryogenic tanks now lasts two full days. Downtime for change is minimized; the single tanks take up a fraction of the floor space formerly used, and the cost per cubic foot of gas used has dropped.

The same advantages apply to the larger central storage tanks. A 337 gallon container, for example, stores the equivalent of 35,000 standard cubic feet of gas. It is 48 in. wide, 61 in. long, and stands 10 ft high. It takes the place of 140 conventional gas cylinders.

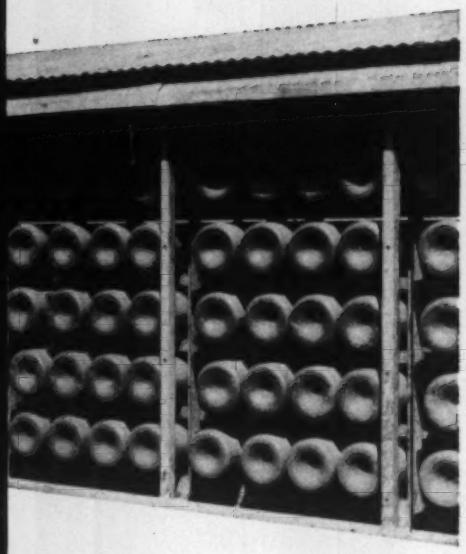
Most commonly stored gases include nitrogen (at −320° F), oxygen (−297° F), argon (−302° F), hydrogen (−423° F), and helium (−452° F).

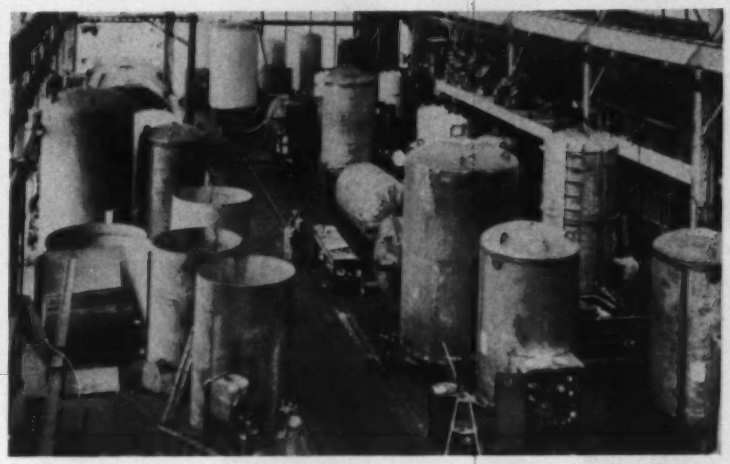
● **Construction**—If your plant installs a liquefied gas system, you'll be working with a tank that's built somewhat like a Thermos bottle. It is a double walled chamber with an evacuated space between. The inner vessel is made from AISI 304 stainless steel, aluminum, or 9 per cent nickel steel. The outer vessel is carbon steel or aluminum (used for portable, over-the-road equipment to reduce tare weight).

The space between the two shells is filled with insulation (perlite, santocel, powdered metals, or layers of aluminum foil and glass fibers). Then the air is evacuated.

● **The Future**—Mr. Haas feels the boom in cryogenic tanks is only beginning. He told STEEL: "By

Foundation of Product Reliability





In the erection bay, a variety of cryogenic gas storage tanks go together. Larger units can be used as central storage units for oxygen consuming steel mills or other large industrial applications

1965, the industry capacity for liquefied gas will be double what it is today. We feel sure that 90 per cent of all gas capacity then will be in liquefied systems." He said this estimate does not include the increasing military demand for liquefied hydrogen and oxygen in the missile activities.

T. Stenson White, president of the company, emphasizes his confidence in the future of the cryogenic field by stating that Ryan plans to start production of LOX (liquefied oxygen) semitrailers within three months.

Mr. Haas says his company has captured over 50 per cent of the available industrial market for the size cryogenic tanks in which it specializes. Due to increasing tank sales, and to improved manufacturing methods, Ryan has managed to reduce the sales price of its tanks each year, despite increases in labor and material costs.

"By 1965, the industry will be producing 55 billion cubic feet of liquefied gases, twice as much as now. This figure represents 10,000 user stations, 1250 transport vehicles, 1000 central storage vessels. Half of those must be built in the next five years."

In this torch cutting operation, the oxygen tank (rear center) has a capacity equal to 12 conventional high pressure gas vessels

Ryan told STEEL it plans to build 4000 gallon cryogenic semitrailers for transport of liquefied gases

Here in a midassembly stage, the 32 station transfer machine is shown with the conveyor. Heads are positioned to use standard cutters wherever possible

Transfer Machine Uses Building Block Setup

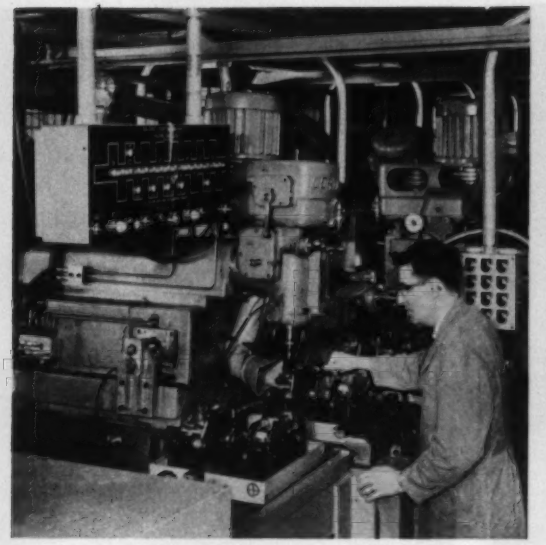
The principle is being applied to multiple operations by a machine tool company. Complete machines are used as blocks. In addition, each station can be used as a single unit by removing the conveyor

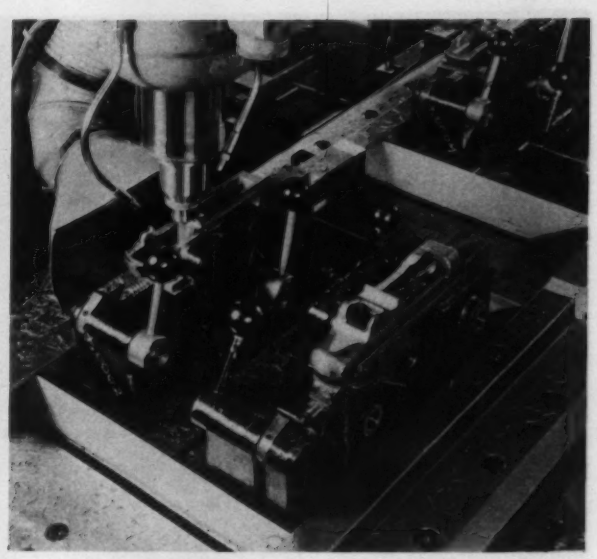
STANDARD machine components that minimize design and building costs are major factors in the approach to special machines made by George Gorton Machine Tool Co., Racine, Wis. The design was used on a two-unit machine that produces the receiver of the M-14 automatic rifle. The buyer: Winchester-Western Div., New Haven, Conn., Olin Mathieson Chemical Corp.

• **Setup**—Each unit has 16 stations. Operations include vertical and horizontal milling, angular milling, undercutting, drilling, and automatic tracer controlled profiling and duplicating. A chain conveyor carries the work fixture from one head to the next. The setup is about comparable to having 32 separate machines (with operators) set in a line, with a conveyor carrying parts from machine to machine. Fixture locating is done at each machine by hydraulic cylinders or "shot pins" that come up underneath the platen to locate it and lock it in place.

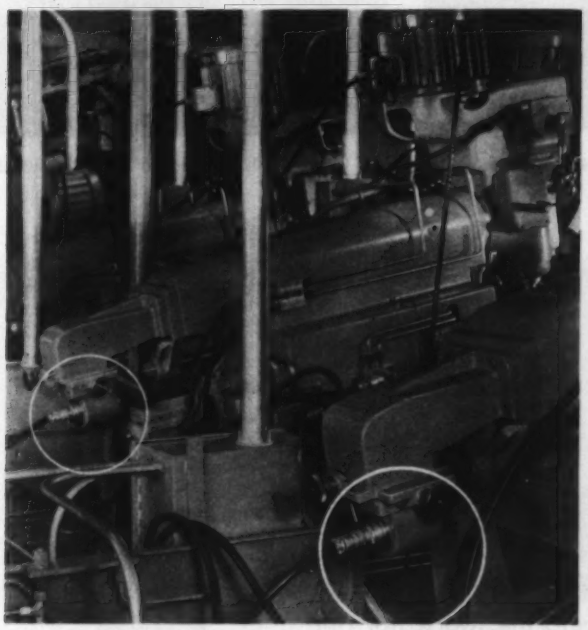
• **Part**—About 110 operations are involved. The receiver starts as a steel forging with a Brinell hardness of 223. It comes to the Gorton Machine with all exterior surfaces broached. About 24 operations must be done after it leaves the machine.

Unit No. 1 has a 360 degree, Auto-Trace, electrohydraulic tracer system at station No. 7 to mill the sight base section of the receiver.





Lights on the operator's control panel indicate the operating status of each machine station. At the right, the twin fixture platen is in operation



On unit No. 2, the 180 degree tracer system is used at station 25 and 26 to control the in and out movement of the ram slide

The feed rate is increased or decreased by the In-Cycle feed regulator built into the tracer template. The feed rate is slowed on sharp radius corners and increased on straight cuts and traverse motions.

● **Feed Regulator**—Brass inserts are placed in the corners of the plastic template where the cutter feed should be slowed. When the tracer makes contact with the inserts, it closes a circuit of a low voltage control system. Special relays in the control cabinet control the cutter feed. Cutter speed is not affected.

Unit No. 2 uses a 180 degree tracer system at stations No. 25, 26, and 32. Tracers on 25 and 26 control the in and out movement of the ram slide. The tracer on station 32 controls the vertical slide movement. Heads are positioned in many different angles to use standard cutters wherever possible. Heads are staggered on both sides of the conveyor so operations such as inspections can be done.

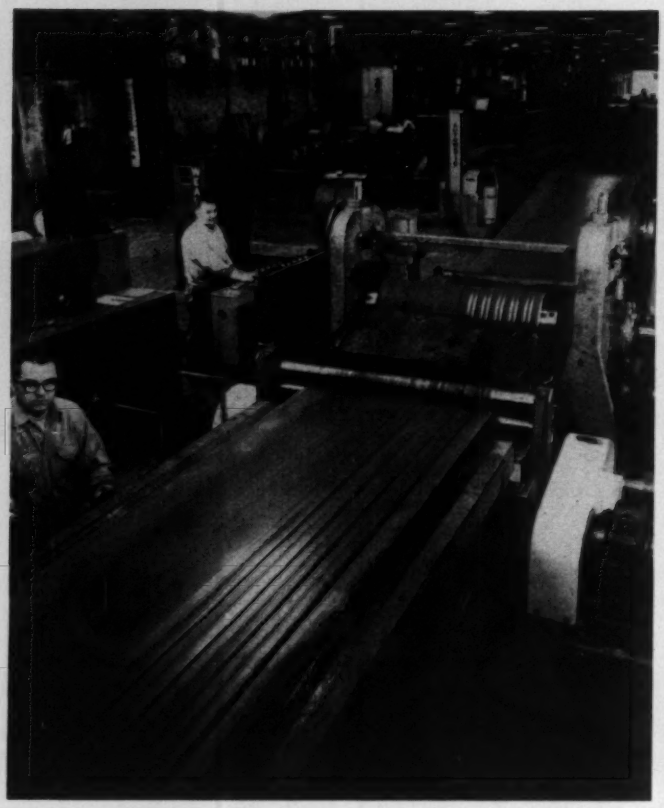
The planned production rate for machine No. 1 is 45 seconds per part. Indexing time for the conveyor from station to station is 3 seconds. Electric eye probing stations are used to check cutter breakage.

Three different faces of the part are presented to the cutters in the machining operations. Each part goes through a machine section twice (32 operations).

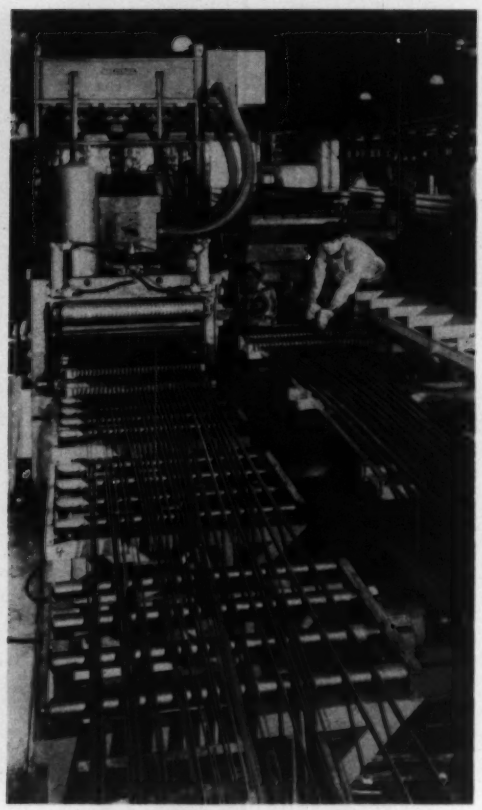
Each conveyor has 43 platens. Each platen carries two fixtures.

● **Chip Problem** — The receiver is reduced from 2 lb 7 oz to 1 lb 6 oz. The chips are handled in three ways: 1. An exhaust system is used in rough and finish cutting operations. 2. Chips are dumped into a conveyor at the far end of the machine as the platen changes direction. 3. The fixture and part are flushed, then drained and dried on return to the unload station.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.



Bars are slit from coiled stock . . .



. . . and fed into the welder . . .

Automated Slitting, Welding Improve Industrial Grating

Coils can be stored conveniently and cut into bars of the exact width required; clean surfaces help the fabricator get the best from modern welding equipment

WELDED industrial grating is being produced on an automated line at the Neville Island plant of Dravo Corp., Pittsburgh. The product, which the company calls Tru-Weld, is said to have superior strength, rigidity, and dimensional accuracy. Development of new equipment and techniques permits the grating to be sold at competitive prices.

Previously, Dravo was a distributor of steel and aluminum grating and stair treads.

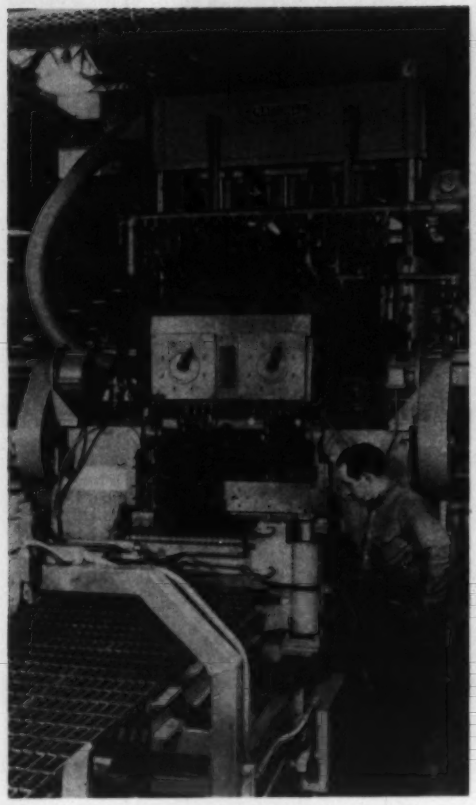
• The company says coiled steel makes better grating and steps up delivery schedules.

Bearing bars are produced by slitting steel coils. That permits close dimensional tolerances.

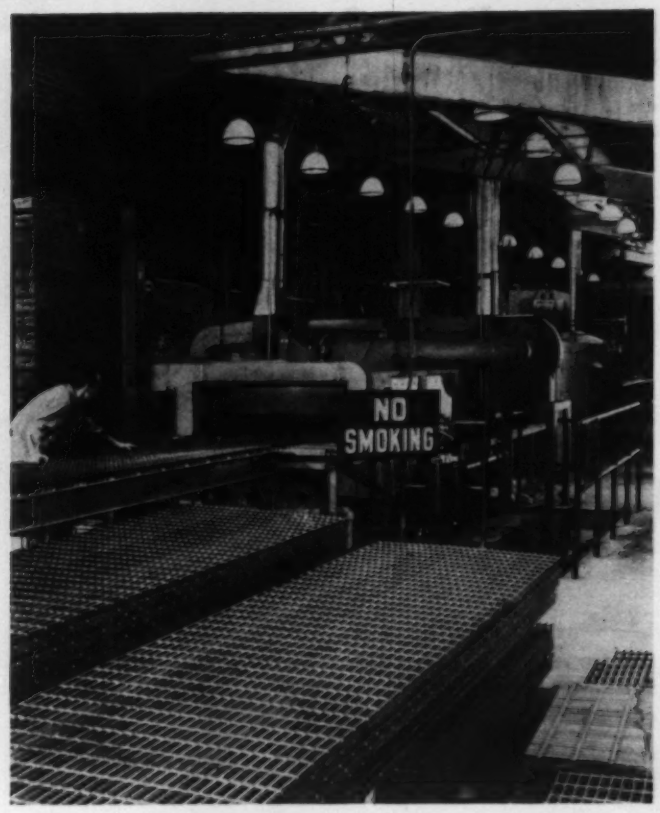
Use of coiled stock also eliminates possible delays in delivery of rolled bar stock, the company says. The coils are easy to store and can be slit as they are needed.

• Advanced welding techniques insure strong joints; accurate indexing makes for proper spacing and alignment of cross and bearing bars.

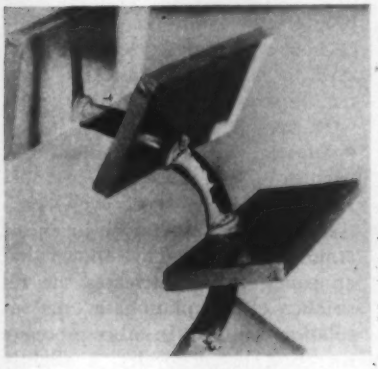
Effectiveness of the welding machine is enhanced by the clean surfaces of slit coil bearing bars. Elimination of rust and mill scale,

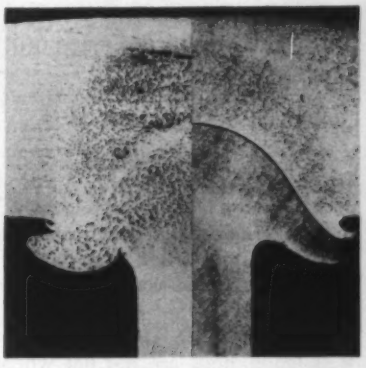


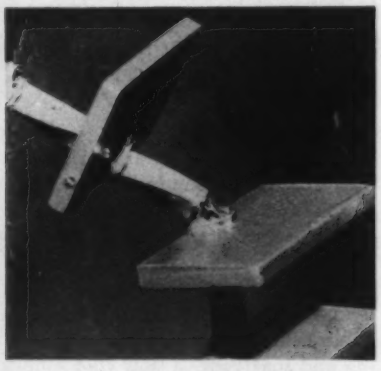
. . . crossbars are fused in place . . .



. . . automatic line puts on paint







Composite photomicrograph shows why clean surfaces produce a well fused weld (left) that can take severe bends without breaking. Joint containing trapped mill scale (right) doesn't have to be bent far before it separates

which would impede resistance welding, permits more complete fusion of metal at the joints. Failure of bearing and crossbars to fuse properly permits moisture to enter the joint and cause corrosion. Protective coatings or paint then chip and flake, boosting maintenance costs.

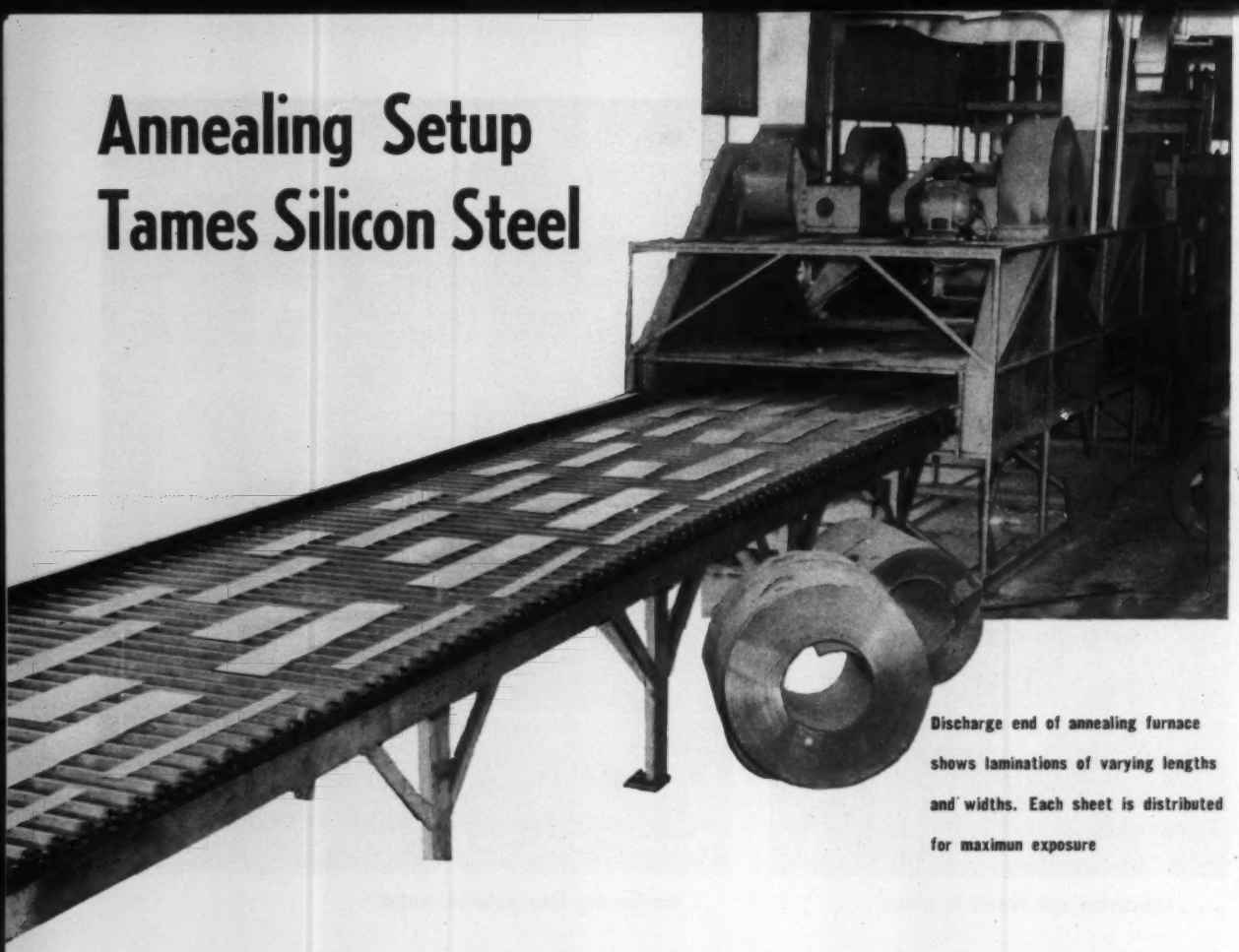
• The company tailors grating to customer specifications.

Estimating and layout services are available to produce grating to customer drawings. To facilitate installation, approval and erection drawings can be sent to the field before the grating is shipped.

The grating is produced in standard panel widths and in standard bearing and crossbar sizes. Panels are 2 or 3 ft wide and 10 to 30 ft long.

Grating is normally produced in 20 ft lengths, but Dravo concentrates on 24 ft lengths, which can be divided into shorter sections without scrap loss.

Annealing Setup Tames Silicon Steel



Discharge end of annealing furnace shows laminations of varying lengths and widths. Each sheet is distributed for maximun exposure

Individual loading of laminations is said to reduce distortion and ripple delivering speedier heatup and cooling of each unit

THE annealing of grain oriented silicon steel in a continuous furnace is producing improved transformer cores at General Electric Co.'s Pittsfield, Mass., and Rome, Ga., plants.

The furnace, designed and built by GE's Industrial Heating Dept., Shelbyville, Ind., consists of a heating and soak zone, a slow cool zone, and a fast cool zone. In each zone, temperature and rate of heating and cooling are adjustable.

The laminations are relatively free of stress and ripple and have a superior surface coating.

• Grain oriented silicon steel is stress sensitive. Core loss, permeability, and magnetostriction are affected by stresses in the steel.

The laminations are fed automatically and individually into the furnace. They are subjected to a fast heatup and are held at a prescribed temperature long enough to remove all the stresses but short of introducing permanent distortion. Slow, uniform cooling follows, to prevent any physical distortion or stress. The last stage: Rapid cooling to room temperature.

• If laminations are not flat when stacked or clamped into plate cores, they become stressed. Results: Poor space factor and degradation of the magnetic characteristics.

Single sheet loading is said to reduce distortion and ripple. The surface of each lamination is uniformly heated. The temperature gradient during heating and cooling is along the length of the sheet, which prevents the formation of stresses.

In stacked sheets, heat flows from the edge to the center. The technique introduces stresses which cause permanent deformation. Partial remedy: Slow cooling. Some 60 hour annealing cycles have been used to minimize ripple. But they require strict atmospheric control.

• Superior surface insulation contributes to lower core loss.

Because of its short cycle, continuous annealing is done in an air atmosphere. Tests have shown that annealing in air increases the resistance of the phosphate type insulation coating. In other processes requiring longer cycles, a slightly reducing atmosphere (cracked natural gas or dissociated ammonia) protects the steel from carbon contamination but adversely affects the coating.

Furnaces use about 260 kw-hr of electricity per ton of work. They are designed to operate at 1472° F but can be used at 1652° F. A variable speed drive controls travel of the laminations through the furnace. Operation is flexible; laminations of several lengths and widths can be processed at the same time.

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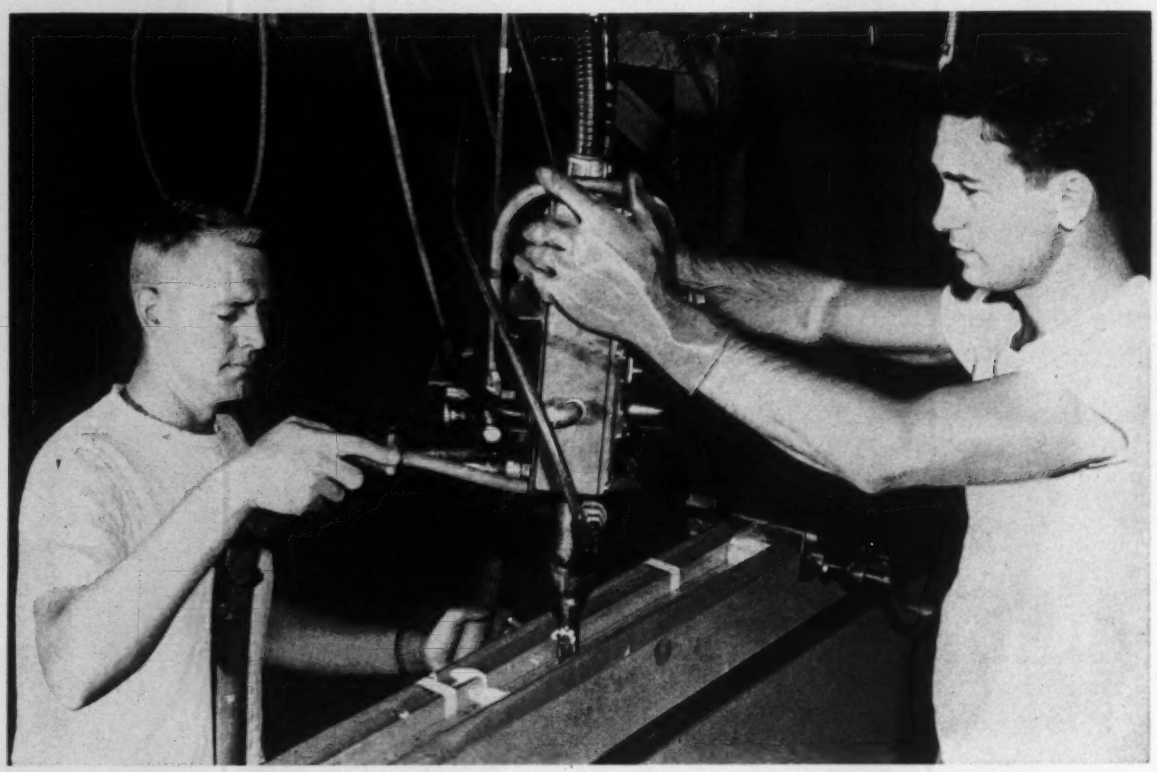

Close-up of foaming gun. Basic chemicals are shot into panel by gun and expand rapidly. Heat is generated in foaming process; foam hardens as it cools, forming rigid core that adheres tightly to metal skins

Glutinous Plastic Applied As Core for Curtain Walls

Urethane foam contributes structural as well as insulating properties. Its hard strength permits the use of lighter gage panel sheets. Potential regarded as almost limitless

A CHEMICAL foam that hardens into a rigid slab and sticks to almost anything it touches is finding growing use as an insulator and core structure for stressed steel curtain wall panels.

Mobay Chemical Co., Pittsburgh, formulates the foam, a plastic called urethane, for panels fabricated at U. S. Steel's American Bridge Div., Harrisburg, Pa.

• **Assembled Without Fasteners**—In making standard panels, the steel shell is placed in a form and filled (1 minute) with urethane, which expands rapidly. When the foam cools and hardens (15 minutes), the form is stripped and the excess foam trimmed. The result is a rigid, light panel, with the core and sheets held without adhesive or fasteners.

Urethane foam used for panel construction is self-extinguishing when the source of fire is removed. It is stable at temperatures ranging from −100 to 250° F in a continuous operating temperature, and can withstand heat in excess of 400° F for brief periods without altering its physical or chemical forms, reports Mobay.

• **Lighter, Stronger Panels**—Panel skin thickness has been reduced to 22-24 gage, although standard panels were previously made from 16 to 18 gage metal. In a test, 24 gage steel backed with foam of 2 to 2.5 lb per cubic foot density (the practical level dictated by economic, thermal, and acoustic consideration) had puncture resistance equal to that of 18 gage steel with no foam backup.

In compression and load tests, an 8 ft x 4 ft x 3 in. panel indicated a load bearing compressive strength of almost 20,000 psf. A full panel loaded as a simple supporting beam with an 8 ft clear span withstood a load of 237 psf without buckling.

• **Proposed Uses**—American Bridge regards urethane foam's potential as almost limitless. It is now being used to fill hollow steel doors, eliminating most of the structural crossbracing, and the automobile industry is evaluating the material and developing foam-in-place machinery (no oven or heated molds are necessary) for insulating autos.

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Three different table styles are available, including a fixed table for straight comparison work, a plain table, and a measuring table which gives you 6 square inches of measuring area. All measurements are read directly to .0001", without computation.

Among other things, the TC-10 is adaptable for *reflection inspection*. Reflected images are extremely sharp—even at high magnifications.

Other "big machine" features include Angle Measuring; Quick-Change Lens Mount; Vertical Staging; Tracing Inspection. And there's a big bonus in the 5X, 2" aperture lens, which gives inspection capacity and accuracy hitherto unattainable on a machine of this size. Write for folder. Jones & Lamson Machine Company, 517 Clinton St., Springfield, Vt.

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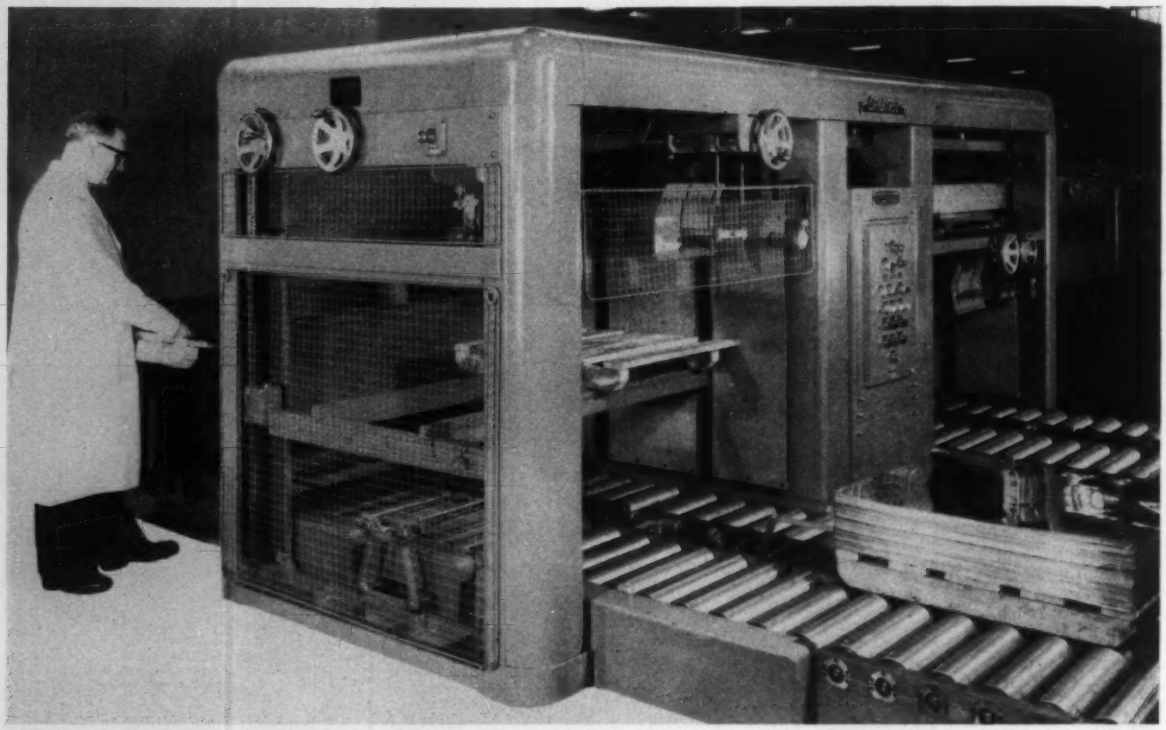


Loaded pallet leaves the sorting and stacking machine as an empty is hoisted into position; operator is filling the incoming hopper with empties

Sheets Graded, Stacked Automatically

Electronic memory device detects offgage material, surface flaws, and perforations; prime and reject sheets are loaded on pallets and ejected from the machine

THE LATEST in coil fed sheeting lines may include machinery to sort and stack steel sheets automatically.

A sorting machine developed by an English firm, Bren Mfg. Co., Team Valley, Gateshead, a division of the R. W. Crabtree organization, will be tested in a complete canning line. (The line will be supplied by an American company.)

• The machine may find application in other areas; manual material handling is minimized.

Makers of the machine, which is said to be 12 to 14 ft shorter than others available, expect it to be used in electrolytic tinning lines, or in production processes where aluminum sheets are handled. (Aluminum sheets have been sorted by the machine without end or surface damage.)

Manual handling is limited to removal of loaded pallets and stacking of empties on an incoming conveyor. Previously, graders used on sheeting lines were automatic in selection, but pallets had to be inserted, positioned, disengaged, and unloaded manually.

• The grader separates prime and reject sheets electronically and stacks them neatly on pallets.

Sheets are cropped from coiled strip on the shear line and fed to the conveyor, where single sheets are inspected and rejects are stacked. Prime sheets are carried to the end of the machine, where they fall into a natural stacked position on a pallet.

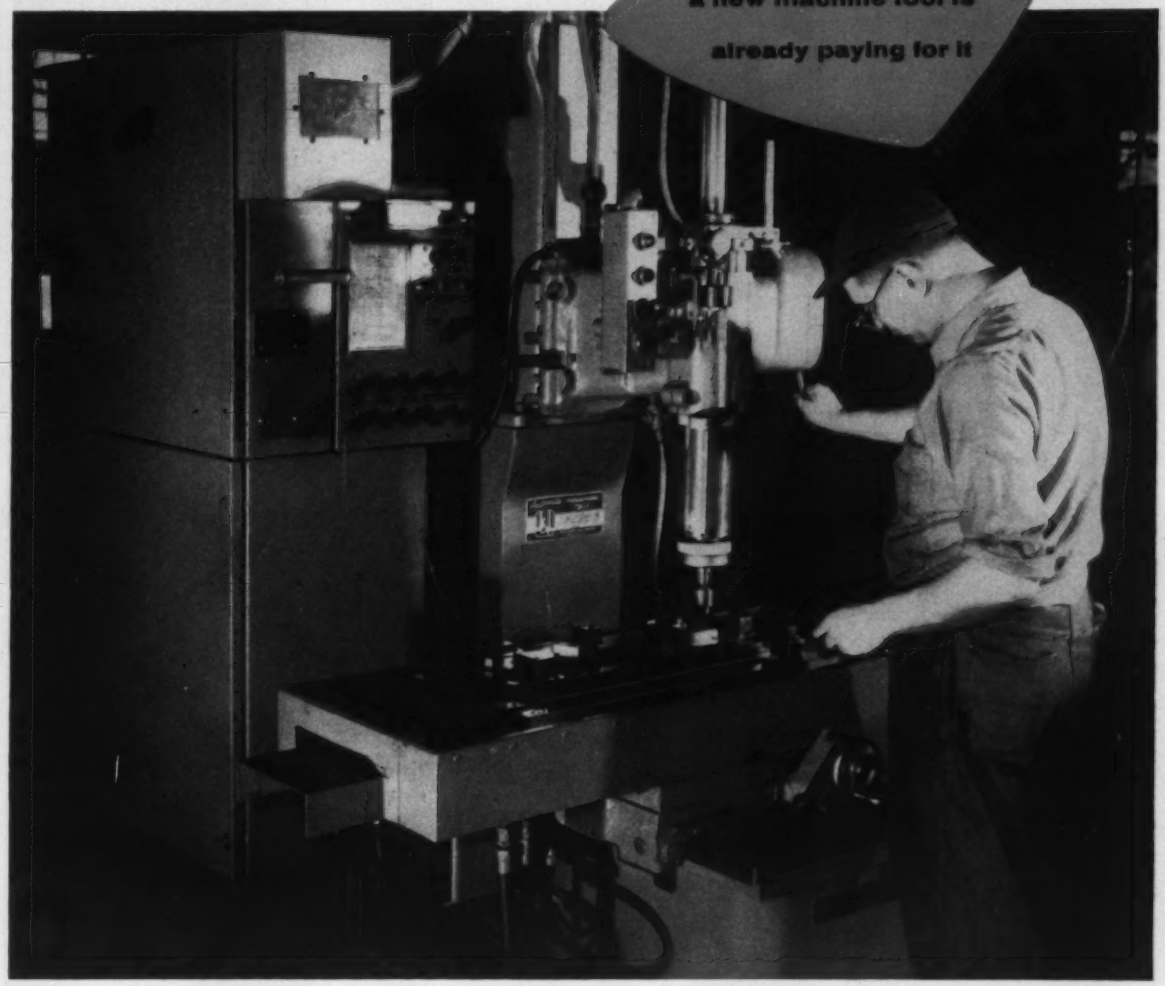
Rejection of sheets is controlled by an electronic memory device that passes signals based on a thickness tolerance of ±0.0005 in., detection of perforations, and surface condition of the material. The signals operate the rejection gate of the grader electrically, and imperfect stock is diverted to the lower conveyor, which leads to the reject stacking station.

Normally, the conveyor belts on the machine operate at about 700 ft a minute, but speeds can be varied from 100 to 1200 ft a minute. The machine can handle sheets 18 by 24 in. to 38 by 44 in. at a maximum rate of 175 pieces per minute. It can carry pallet loads up to 9000 lb.

• When a preset number of sheets has been stacked, the loaded pallet

JONES & LAMSON "AUTOMATION"

the man who needs a new machine tool is already paying for it



Major savings on every job during first full year of tape control operation

At The Goss Company, a division of Miehle-Goss-Dexter, Inc., Chicago, tape control machining plays an important part in the over-all production operation.

For instance, this J & L tape-controlled positioning table, equipped with a standard column drill press, has achieved an average of 30 to 40% savings in floor-to-floor time on every job assigned. One job, involving drilling and reaming of small malleable iron transfer roll adjusting plates, was transferred from a conventional sensitive drill press setup to the J & L machine. Job lots consisted of only four pieces.

The old setup required 3.1 hours production time for each lot. Using tape control, with a simple locating and clamping setup, Goss has been able to cut this time to 1.7 hours—a saving of 1.4 hours per lot, or more than 45%. Hole location is more accurate too, because J & L tape control consistently holds tolerances of + or — .001". With the old setup, it was difficult to hold hole locations to less than .010" on layout jobs of this size.

Investigate how *production-proven* tape control units can help increase the efficiency of *your* operation. Write to Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont for folder 5902, "Tape Control Positioning".

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

is replaced with an empty.

Photoelectric cells control the height of the prime and reject stacks and start the sequence of electro-mechanical processes that ejects full pallets and replaces them with empties. Four prongs, moving through the stacker until they are supported by extension bars fitted to the back of the sorter, shoot out from the pile plate and catch the first sheet of the new pile. The full pallet is lowered until it rests on rollers on the floor. As the loaded pallet is moved away, an empty is positioned above the pile beams by retractable stops. The pile beam assembly then rises, bringing the empty pallet upward until it supports the new stack. Then the top sheet is kept at constant height until the preset number is again accumulated. Pallet hoists can be actuated manually.

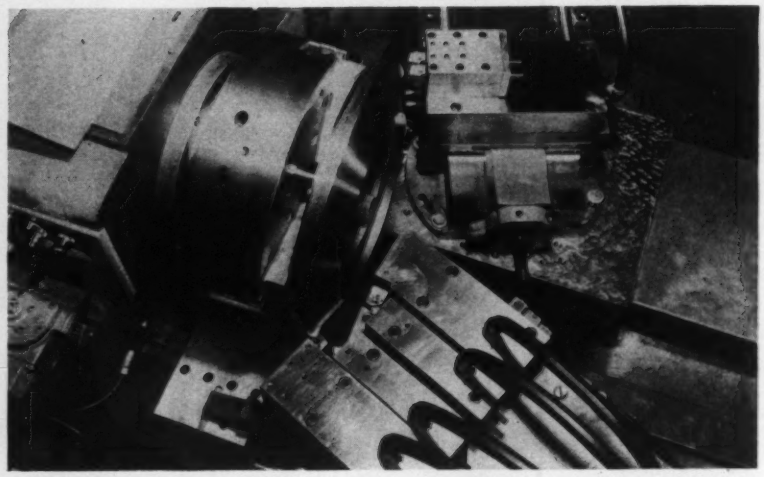
When a loaded pallet rolls to the end of the ejection conveyor, it sets off an alarm bell, which rings until the pallet is removed. A bell also rings when the last empty has been taken from the incoming hopper. Colored lights also warn when pallets are to be loaded on the machine or taken away.

A pile-up of sheets on the conveyors automatically shuts down the machine. Manually operated stop buttons are also available. And a limit switch stops the machine if the pile beam rises beyond the preset height.

Welded Wire Mesh Used in Building Asphalt Roads

Steel reinforcement of asphalt type pavements cuts cracking and chuck hole formation, says American Steel & Wire Div., Cleveland, U. S. Steel Corp.

Long used for the strengthening of concrete in road construction, welded wire fabric is imbedded in the asphalt material when the road is built. And when repairs are made to cracked or broken up road sections, the reinforcing mesh makes a more durable patch. At Washington, a highway department official reported the method reduced transverse reflection cracking by 60 per cent and practically eliminated all other forms of cracking.



Tooling setup shows the surfaces machined in the first operation on a typical 24½ in. bevel ring gear forging

Automatic Chucking Lathes Speed Short Run Jobs

TWO automatic chucking lathes cut time requirements an average of 30 per cent on work formerly done with three older machines at Fairfield Mfg. Co. Inc., Lafayette, Ind.

Three factors were responsible for the savings: The automatic cycle on the lathes, the use of carbides for heavy stock removal, and fast changeover.

• **Case History** — Fairfield makes gears in small lots (20 to 200 pieces) for heavy duty trucks, earth moving, road building, and mining equipment. The lathes (Gisholt Masterline No. 24s) handle a large variety of bevel and spur ring blanks for gears from 18 to 33 in. OD.

• **Special Tooling** — The special tooling includes a front carriage with an adjustable base and front and rear independent slides mounted on 90 degree, angularly graduated, swivel bases.

Each slide has two automatically preset forward feeds and one reverse feed.

• **Typical Workpiece** — A typical job is a 24½ in. bevel ring gear forging. The workpiece is chucked in the unmachined bore and located against studs on the chuck face. The front face surfaces are completed in one chucking. Operations include rough and finish facing of the bevel, straddle turning the back angle on the OD, boring the co-bore, and forming radiuses at both corners of the beveled area.

• **Second Operation**—In the second operation, the slides have been repositioned. In this step, the work is chucked on the OD, locating against a bevel in a set of special, formed chuck jaws. Operations include rough and finish boring of the ID, boring of the co-bore, chamfering for the inside corner of the flange, and forming the radius on the OD.

• **Time Requirement Comparison**—Floor to floor time for operation No. 1 is 10.5 minutes on the No. 24 compared with 31.5 minutes on previous equipment. On operation No. 2, the time is 11.75 minutes compared with 38 minutes.

JONES & LAMSON MACHINE TOOLS

the man who needs a new machine tool is already paying for it

Two-dimension tracing eliminates secondary operations and reduces costly "off" machine time

Two-dimension tracing, combined with conventional turret lathe tooling, provides an extremely versatile method for complete machining to tight specifications.

For instance, the end use of the connecting rod bolt (illustrated above) demands extremely fine finish to eliminate the starting of fatigue cracks. In addition, relief surfaces, O.D., head faces, and threaded end must all be square and concentric. Radii of fillets connecting the different diameters must be smooth and free from scratches. Two reliefs, each 6½″ in length, must be held to + or — .002″ and to 40-50 RMS to eliminate subsequent grinding operations. The finished parts are 19-3/4″ long with different O.D.'s varying from 1-1/2″ to 2-7/16″. The material is tough: AISI 4140; Brinell 241.

All this is accomplished in one tooling set-up on a J&L turret lathe with a two-dimensional tracer. Floor-to-floor time for finished parts is less than three minutes on the head end, and less than nine minutes on the shank end. Write for Folder #5903.

Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

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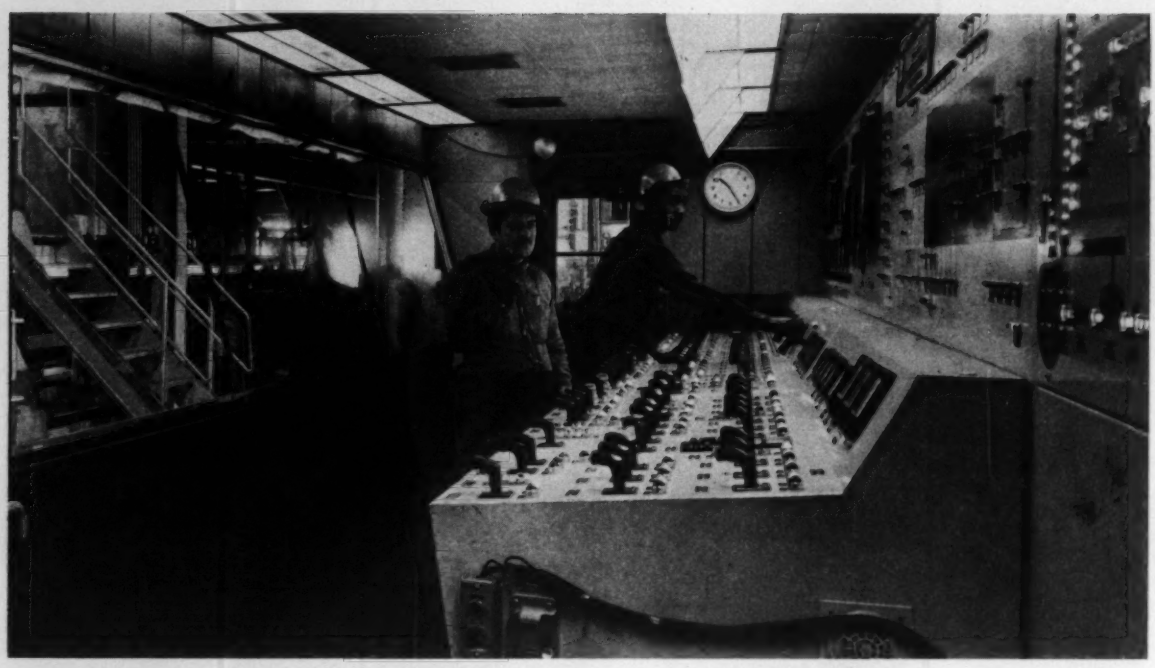


Operators on duty around the clock in this one instrument station control daily output of 4000 tons of sinter at Inland Steel Co.'s Indiana Works

Sinter Plant Is Co-ordinated From Master Controlroom

Personnel at various stations use intercom to inform operators of malfunctions, or to ask for changes in the flow of sinter material, air, or fuel gas

OPERATION of a sinter plant with a 24 hour output of 4000 tons is controlled from one instrument station at the Indiana Harbor (Ind.) Works of Inland Steel Co.

The plant and screening station were designed and erected by Dwight Lloyd Div., McDowell Co. Inc., Cleveland, with assists from Inland's engineering and operating personnel.

• Material flow and machine speeds are regulated from the main control desk.

Switchboards and recorders are housed in an air conditioned room at the entry end of the sinter strand. Draft and flow gages and recorders are on the back panel of the booth, incorporated in a flow diagram of the plant. A large, plate glass window permits observation of the ignition furnaces and the moving pallets on the strand.

Operators regulate the flow of sinter material, air, and fuel gas from the control center. Requests for control changes and information on malfunctions come from personnel at various parts of the plant by intercom.

• Incoming ore and coke are classified in the screening station and taken by conveyors to the appropriate material bins.

Raw ore is delivered to four surge bins. A pan type conveyor under each bin empties onto a double deck screen for separation. Coarse ore is returned to the blast furnace, and fines are fed into the material bins. An automatic cutoff switch stops all belts feeding the surge bins if the pan feeders are blocked. A plate system in the hoppers permits operators to direct ore flow.

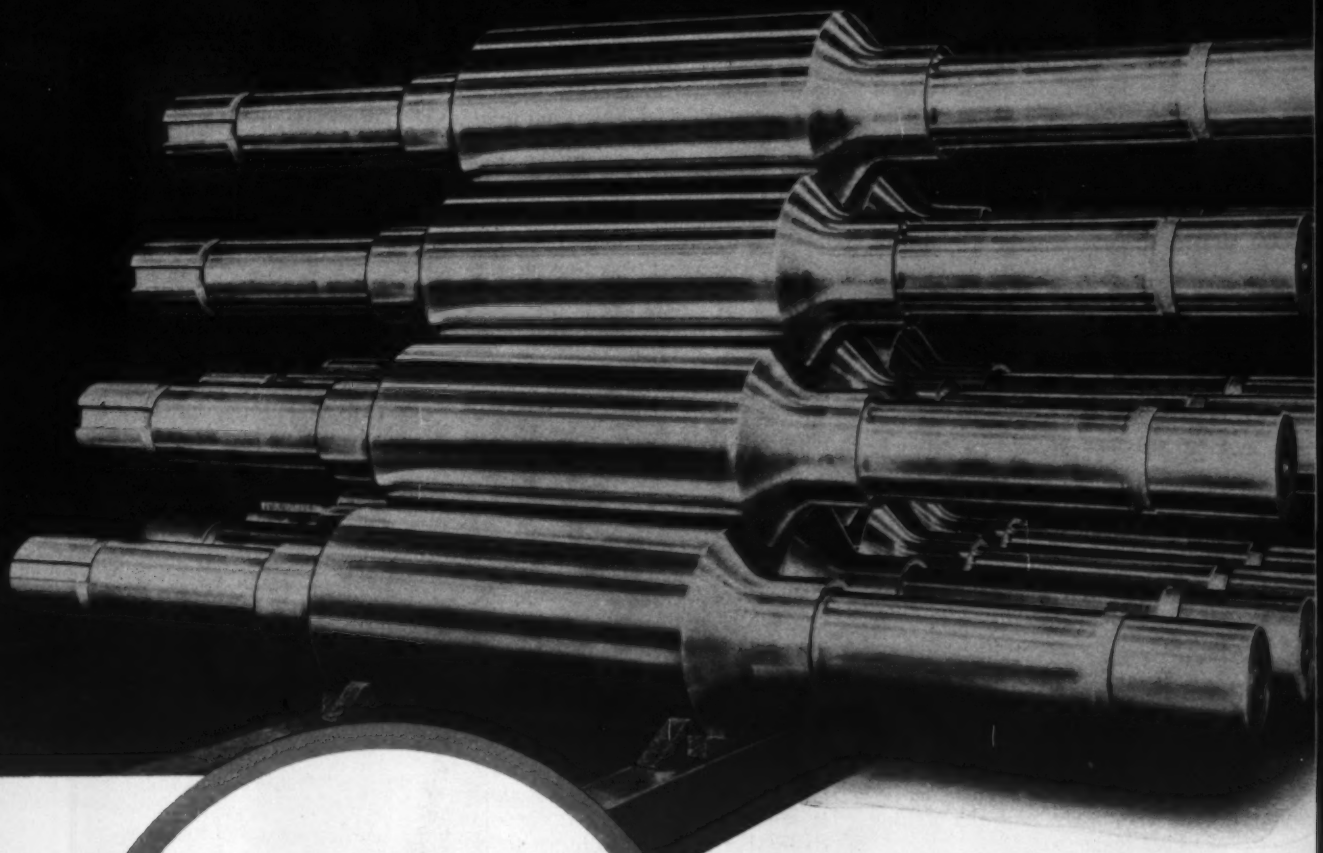
A 36-ton-per-hour rod mill on the main floor crushes coke from the miscellaneous material track hopper after rubble has been screened out. Coke that doesn't have to be crushed can bypass the bin and crusher; it travels directly to the main belt.

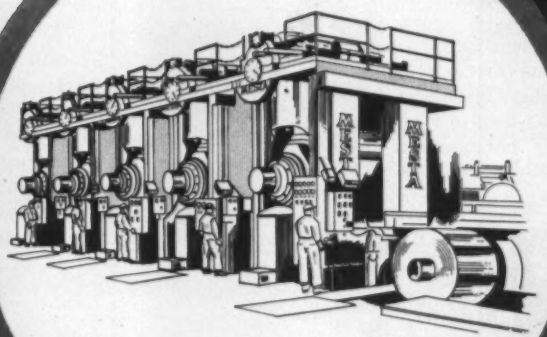
Material bins hold enough ore fines, coke, and other materials for about 16 hours of production. The materials are mixed and pelletized by two McDowell Flying Saucers.

• The sinter machine is designed for flexible operation.

A brick lined hearth layer bin and oscillating belt feeder are at the entry end of the machine. Electrodes placed on the slope of the material automatically regulate machine speed. Two, 75 hp motors,

MESTA ROLLS





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with speed reducers and a timing belt, drive the machine at speeds up to 18 ft a minute.

The sinter strand is 8 ft wide by 168 ft long; its 21 windboxes are alternated to prevent pallets from skewing. Teflon sliding seals minimize air infiltration into the pallets, which roll down the strand on rails. Side plates are 18 in. high, but 22 in. plates can be installed if a thicker sinter bed is to be processed.

The machine has five ignition furnaces, which can be operated independently. Ordinarily, two to four of the furnaces are operated, depending on strand speed. Heat from three furnaces, at gradually increasing intensity, penetrates the sinter mix better than one big blast, says Cleo Sheets, general sinter plant foreman.

The main suction fan provides the right amount of air for proper combustion of the mix on the grate bars. Air requirements are determined by the amount of fuel used and the machine speed. Too much air slows combustion by cooling the sinter.

Elbows between the windboxes and the large chamber below are lined with silicon carbide refractory bricks. The settling chamber under the machine is firebrick lined, with a 1/4 in. asbestos liner between the bricks and the settling chamber plate.

Alloy steel grate bars can be replaced individually. Main drive sprocket teeth can be replaced or repaired.

The main dust collecting system, a Multiclone and electrostatic precipitator, is said to have an over-all efficiency of 98 per cent.

• Hot sinter is broken and screened at the exit end of the strand.

The material passes through a breaker at the end of the machine and falls onto a vibrating conveyor type screen. Coarse sinter passes to a second conveyor and is carried to the cooler. Hot fines drop onto a third conveyor, which dumps them on sinter from the cooler, headed for the screening station. Hot fines can be cooled by a steam or water spray.

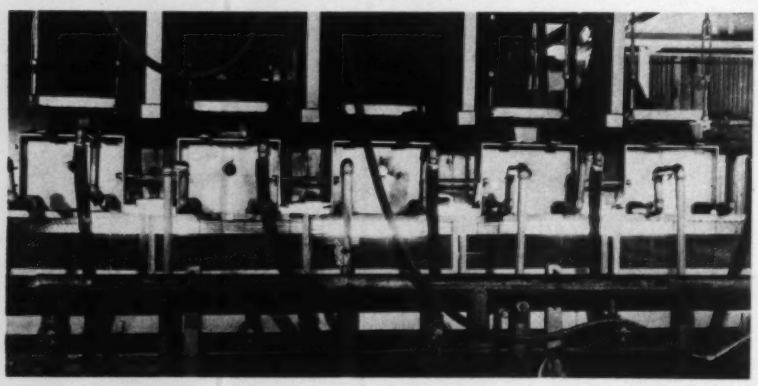
The supporting structure at the discharge end of the machine is water cooled. A dust collection hood covers the crusher, hot screen, and grizzlies (coarse separators). The hot screen and sinter crusher can be removed as units, and replaced with repaired spares, to minimize downtime for repairs.

• A circular cooler reduces sinter temperature to 250° F.

The cooler has a mean working diameter of 80 ft. Air is supplied by four, 120,000 cfm forced draft fans.

Cooling grates, traveling counterclockwise, drop sinter into a rail lined bin to absorb initial shock. Then the material is fed onto a belt by a variable speed vibrating feeder and overflow chute. Feeder speed is automatically regulated by the cooler, but it can be adjusted independently.

Cooling air is blown into a large chamber under the traveling pans. Normally, sinter stays in the cooler about 23 minutes. Twelve hoppers under the cooling chamber catch fine material, which is recirculated.



Mix passes under five ignition furnaces. Two to four of the units are usually fired, depending on the speed of the strand. Gradual application of heat from several furnaces is said to be better than a sudden shock from one furnace

Boron Isotope Used For Nuclear Alloy

HIGH neutron absorption and excellent mechanical properties are combined in a new Type 304 stainless steel containing boron. Use of the boron 10 isotope is responsible, reports Carpenter Steel Co., Reading, Pa.

• Better than Natural — Nuclear properties of boron make it desirable for such applications as control rods and shielding in reactors. Stainless steels containing substantial additions of the element have been used. Naturally occurring boron consists of a mixture of the isotopes; the boron 10 isotope has about 10 times the effectiveness of the natural material.

Additions of boron up to 2 per cent have been used for building neutron absorption but such large additions affect the physical properties and corrosion resistance of the alloy, Carpenter notes. If more of the boron 10 isotope is used, the effectiveness at the 2 per cent level is increased, or the amount of boron added can be cut.

• Physical Properties—Adding boron to stainless Type 304 increases the tensile and yield strengths, reduces ductility, impact strength, and corrosion resistance. Since 0.2 per cent of boron 10 will give equivalent nuclear properties to 2.0 per cent of the natural element, such a material would be expected to give longer service life in corrosive atmospheres with no loss of the nuclear properties. At the 0.2 per cent boron level, there is little change in physical and corrosion properties when compared with standard Type 304.

The use of the boron 10 additive also offers the possibility of producing a borated stainless with higher neutron absorption than could have been obtained with the naturally occurring isotope mixture. As with the natural element, up to 2 per cent can be added, but the effectiveness is increased.

Naturally occurring boron contains 18.4 per cent of the boron 10 isotope; the balance is boron 11, which has a much lower neutron cross section.

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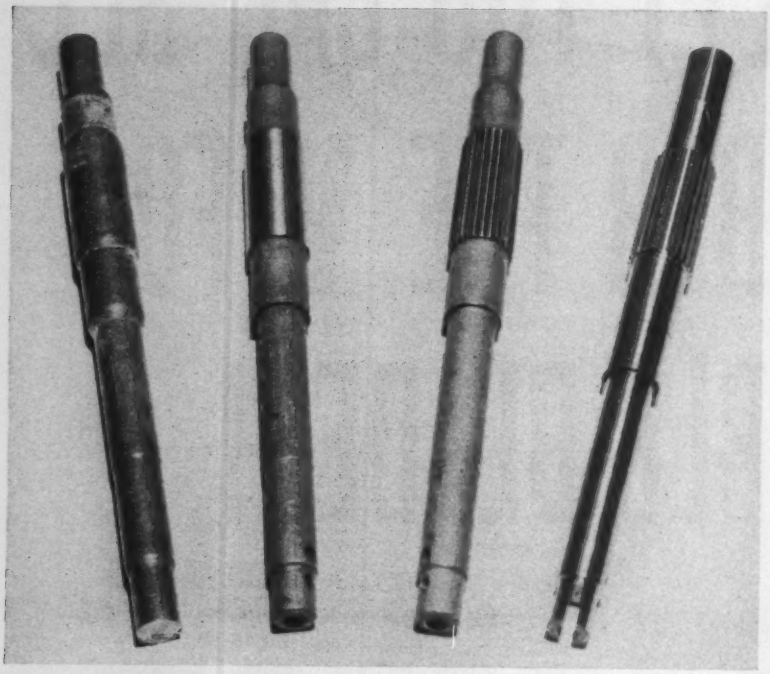
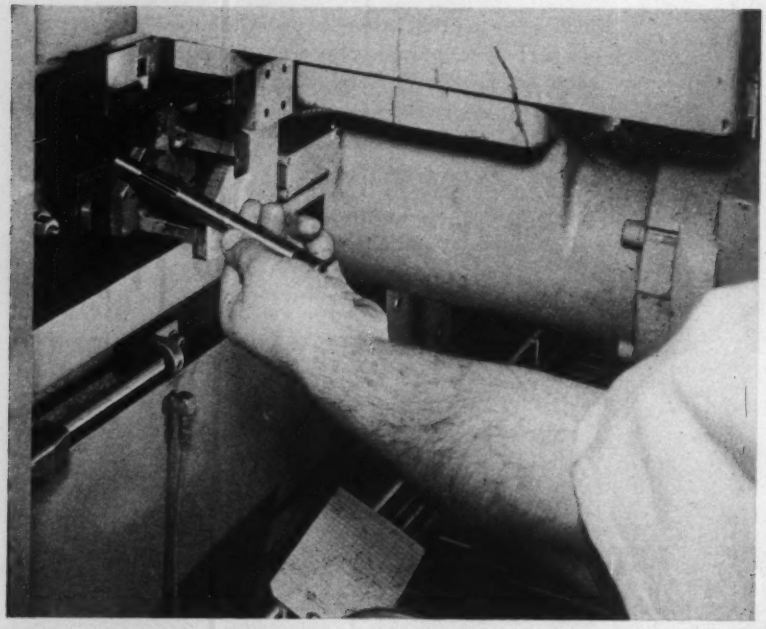


Four stages in the manufacture of a propeller shaft: Left to right: 1. As-purchased, precision cold formed shaft. 2. Machined, hardened, and spline diameter ground. 3. Spline rolled. 4. All diameters finish ground



Close-up of loading station on Roto-Flo machine shows spline forming racks and a finished shaft

Evinrude Motors cold forms them on hardened, Type 410 stainless shafts at the rate of 182 an hour. That compares with a hobbing rate of 13 pieces an hour

COLD ROLLING of splines on stainless shafts increased production 1300 per cent at the plant of a Milwaukee outboard motor manufacturer.

Evinrude Motors, a division of Outboard Marine Corp., figures the cost-per-piece saving of cold rolling over hobbing as secondary to the elimination of a bottleneck. The tremendous increase in pieces per hour corrects a condition which held up other fabricating operations.

• **How Production Compares** — Al Goike, chief methods engineer, figures the floor-to-floor time for rolling a spline is 0.33 minute, or about 182 parts an hour. When the splines were hobbed, production was 13 an hour, with a floor-to-floor time of 4.60 minutes per piece.

The splined part is the propeller shaft for an outboard. A shifter dog rides on the spline to select forward, neutral, or reverse speeds. Type 410 stainless is used to resist corrosion.

• **Rolled After Hardening**—Evinrude buys the shafts from Molloy Mfg. Co., Detroit, and the Die Formed Products Div., Republic Steel Corp., Malvern, Ohio. The precision cold formed blanks are supplied in an annealed state; the company heat treats them to Rockwell C 38-40 before rolling.

They are pickled before rolling to remove scale. If the splines were rolled with the shaft in the soft condition then hardened, a scale removing pickle might etch the spline teeth and weaken them, explains Mr. Goike.

• **Hold Close Tolerances**—Evinrude has two Roto-Flo machines (made

by Michigan Tool Co., Detroit). One takes 24 in. racks (spline forming tools), the other takes 36 in. racks. Spline diameters vary from 0.625 to 1.125 in. The larger Roto-Flo is used for the larger diameter shafts.

The machines roll splines parallel with the axis to within 0.0005 in. per inch. Runout is held to 0.005 in. total indicator reading. If splines were hardened after rolling, some parallelism would be lost because of heat treat distortion.

• **Tool Cost vs. Output**—In many spline rolling operations, cost per piece is considerably lower than in hobbing. Tool cost is the one element which trims away most of the cost differential.

Because the Milwaukee firm rolls the splines on hardened stainless, tool life of the racks is noticeably shortened. Mr. Goike says he gets about 10,000 pieces per grind, or about 40,000 pieces per set of racks (initial grind and three regrinds). Racks cost $2000, plus $750 per regrind.

A hob costs only about $65, and Evinrude used to get about 4800 pieces off a hob, which included six regrinds.

• **Sequence of Operation**—The as-purchased cold formed shafts are first milled to length and centered on a special Evinrude machine. Shoulders are cleaned up on a lathe and holes are drilled in one end of the piece. The shafts then go into a furnace for the hardening operation. A scale removing pickle follows.

Spline diameters are ground and the shafts loaded into the forming machines by hand. One pass of the racks over the shaft forms the spline. All diameters of the shaft are given a finish grind.

Last step before installing the shaft in an outboard is a passivation treatment to enhance the corrosion resistance of the stainless steel.

Have You Entered?

See Pages 5 and 6.

Polystyrene Pattern Simplifies Casting

THE 400 lb bronze Pegasus (above) demonstrates how engineering and art were combined to develop a new art casting technique. Massachusetts Institute of Technology, Cambridge, Mass., calls it foam vaporization. The process is based on the fact that polystyrene vaporizes at elevated temperatures.

To make a sculpture, a model is carved from a block of foamed polystyrene (porous plastic) and used as the pattern for a mold. The metal (aluminum, copper-base alloys, irons, and steels) is then poured. Instant sublimation of the plastic occurs on contact with the hot metal, and the vaporized styrene escapes through the mold.

The developer, Alfred M. Duca, professional artist and research associate, M.I.T.'s Department of Metallurgy, poured the bronze into the mold without removing the model.

The process, suitable for single casting, can be readily fitted into present foundry facilities.

• Any suitable refractory material can be employed with the process, reports Dr. Howard F. Taylor, professor of metallurgy at M.I.T.

The sand can be of various degrees of fineness. It is first bonded with sodium silicate and set or "frozen" by passing carbon dioxide gas through the mold.

Loose (unbonded) sand can be used if the form is bottom gated. A satisfactory bond is formed by the polystyrene vapors condensing in the outer layer of the mold.

Dr. Taylor indicates that the castings tend to duplicate the porous impressions of the plastic—which can be desirable. It permits the artist to introduce interesting textures to his work. For other applications, the remedy is to fill the pores with wax or other inert coatings to obtain the desired surface smoothness.

An advantage to polystyrene is its rigidity. Structural freedom is permitted, and no supports are required to hold the model together.

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Here's a crane that's tailor-made for the popular pre-engineered, steel frame building. Overhang at both ends of the bridge beam permits installation for maximum hook coverage with greatest height under the hook in this type of building. And, "Borg-Warner QUALITY-RATED" is your assurance of maximum performance, reliability and long life.

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Metal Cutting Slotter Is Pendant Controlled

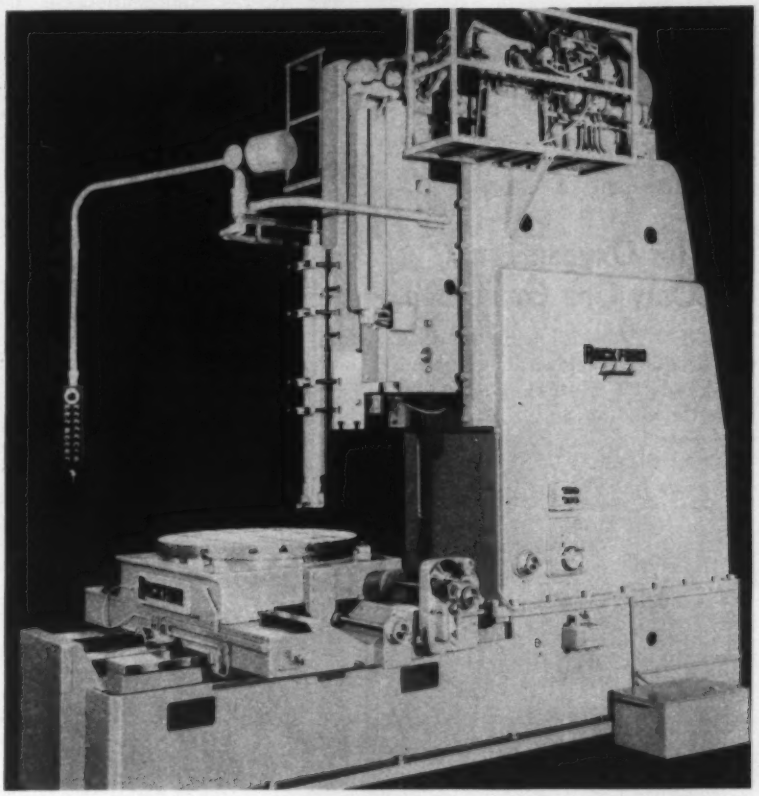
A 36 IN. STROKE, vertical metal cutting slotter has pushbutton control. The machine has a counterbalanced pendant that operates within a range of 240 degrees.

No levers are needed for engagement of feed or traverse movement. The pendant provides selection for longitudinal, rotary, and transverse movements. Two speed traverse enables the operator to reposition the stroke, lengthen or shorten it from the pendant without levers or cranks, or without stopping the machine.

The ram is also locked from the pendant and is interlocked with the ram start and stop to prevent the ram from running when in locked position. The ram may be tilted from the vertical to 10 degrees forward.

The Hy-Draulic drive and feed provide easy machine setup and operation. This design also furnishes immediate response to all controls and operating speeds.

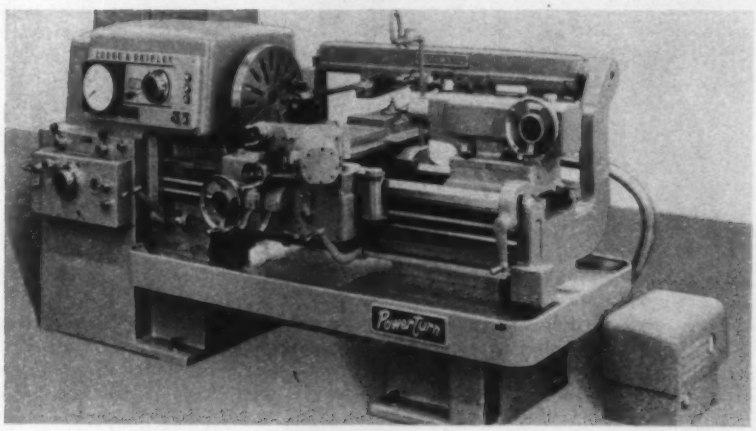
For further information, *write* Rockford Machine Tool Co., Rockford, Ill.



Constant Speed Unit Eliminates Speed Control Cams

HERE is a constant cutting speed lathe that eliminates the need for speed control cams and computations. Constant cutting speed is provided at any point, regardless of contours.

Besides producing a smooth and accurate finish, the unit eliminates the cost and delay of providing a speed control cam for each job. The headstock is equipped with a 24 speed transmission plus a variable speed drive which permits infinitely variable control of each speed. Spindle speed can be dial adjusted even while the machine is operating



automatically.

An operation technique called "combined feeds" increases machining capacities. In combined feeds, longitudinal and cross feeds are engaged simultaneously to give a straight tool path in a line that is a mean of the contour. Then, the hydraulic cylinder needs to provide only for the differences from this path to the contour being machined.

For further information, *write* Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.

Tips for Oxygen Lance Use Only One Connection

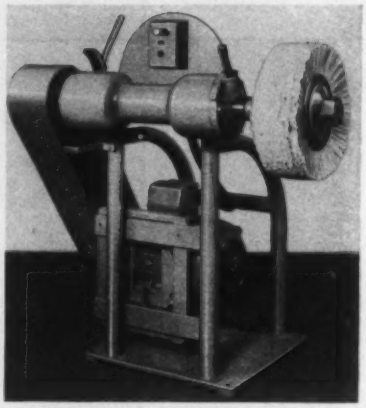
OXYGEN LANCES with tips that can be quickly replaced have been developed by Hutton Fabricating Mfg. Co. Sliding and bolt connections have been eliminated. The tips have only one connection and a lance can be renewed with a replaceable tip in less than an hour.

An improved water cooling system concentrates the coolant at critical points of the tip. Different lengths are available. Standard copper, stainless, or special tips can be furnished.

For further information, *write* Hutton Fabricating Mfg. Co., 2740 E. 79th St., Cleveland 4, Ohio.

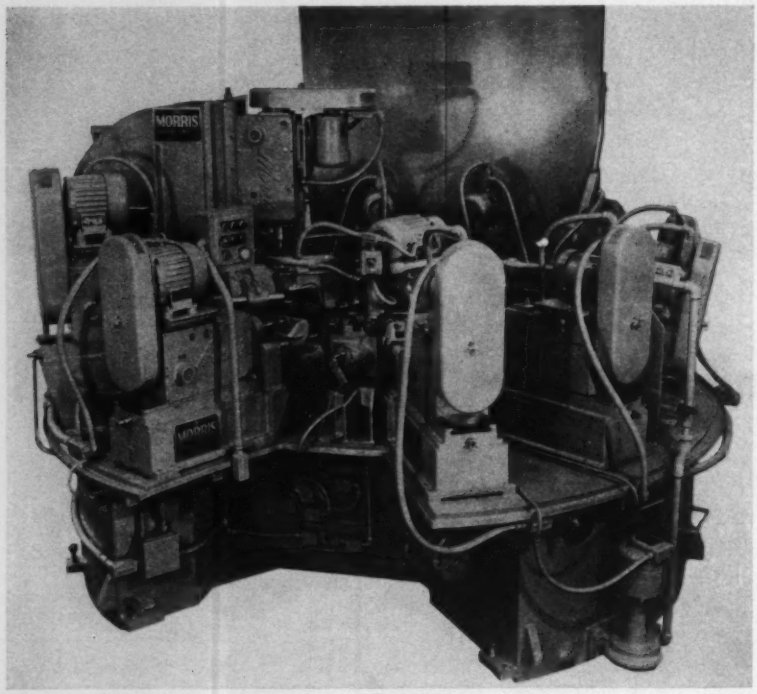
Simplified Lathe Design Polishes, Deburrs, Buffs

A SIMPLIFIED lathe for polishing, buffing, deburring, and brushing has eliminated excess cast iron and inside base adjustments. The spindle assembly is mounted on a structural base. The spindle (carbon alloy steel) runs in permanently lubricated bearings within a cast iron housing. Labyrinth seals keep dirt out of the housing.



Capacity ranges from 10 to 20 hp. The spindle is driven by multi-V-belt sheaves. A lock pin holds the spindle stationary for work wheel replacement. A hand brake controls spindle overrun when the motor is stopped. Distance from spindle housing to inside wheel flange is 8 in. Width between flanges (on standard lathe) is 6 in. You can order arbors in 1½ to 2 in. diameters. The unit can fit into a space 34 x 43 in.

For further information, *write* Murray-Way Corp., P. O. Box 180, Birmingham, Mich.



HORIZONTAL, ROTARY INDEXING MACHINE does simultaneous drilling of rotor center holes. The unit has a 36 in. diameter table and a 13 station, automatic Geneva index to drill, ream and mill 260 pieces per hour. Model changeover problems are eliminated by using standard Morris production units. Each unit has independent feeds and speeds which permit adjustment without affecting the entire machine. For further information, **write** Morris Machine Tool Co., 2011 Eastern Ave., Cincinnati 2, Ohio

Centrifugal Casting Unit Produces 20 ft Lengths

TUBULAR castings weighing up to 30,000 lb with lengths up to 20 ft can be made on the Model K horizontal, centrifugal casting machine.

It has jet water cooling, gas mold heating, and an electronically controlled variable speed drive. An adjustable casting support is used. You can order a car type, semiautomatic, spray lance system for spraying molds.

For further information, *write* Centrifugal Casting Machine Co., P. O. Box 947, Tulsa, Okla.

Portable Press Has 1500 lb Maximum Pressure

A PRESS for small assembly work and fabricating jobs has a 4 in. stroke, 1 in. ram, and a 5½ in. throat. Pressure range is 50 to 1500 lb.

The unit fits into a space 10 x 13 in. and weighs 150 lb. A built-in

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SPRING STEEL QUALITY

Control of steel purity. The SANDVIK laboratories carry out more than 200,000 chemical analyses a year.

Research microscope for up to 2,000X enlargements. This microscope is also used for the study of structures, control of heat treatments, macrophotography etc.

At Sandvik, the latest scientific research and quality control techniques constantly improve and protect spring steel quality.

This is part of the reason why Sandvik steels have the special physical stamina to give consistent performance in such critical applications as flapper valves, instrument springs, shock absorbers, surgical instruments, unbreakable watch mainsprings, piston ring segments and expanders, etc.

Sandvik stocks a wide variety of grades and sizes of cold rolled specialty strip steels. For information on leading types, send for this free brochure.

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HAND SAWS & TOOLS

SS-191

hydraulic power unit and ¾ hp motor are used. Several electrical ratings and characteristics are available. It's provided with automatic control. You can get hand lever, pushbutton, or foot controls, if desired.

For further information, *write* John S. Barnes Corp., 315 S. Madison St., Rockford, Ill.

Inhibitive Primer Resists Contaminated Atmospheres

A COLD applied, inhibitive primer (Bitumastic 11-S) resists contaminated industrial or marine atmospheres.

It serves as a shop primer and also prevents undercutting where breaks have occurred in the finish coating. Koppers' tests show good results even with poor preparation of metal surfaces. It won't penetrate heavy rust, but it has been successful in passivating the metal and preventing further development of rust tubercles.

For further information, *write* Koppers Co. Inc., Koppers Bldg., Pittsburgh 19, Pa.

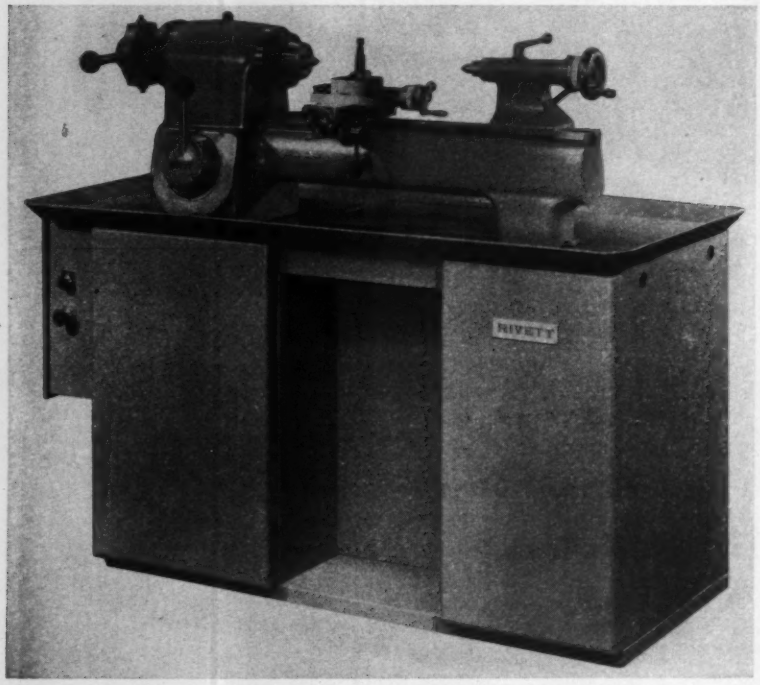
Abrasive Belt Unit Added To Contour Polishing Line

AN ABRASIVE HEAD has been added to the line of contour polishing machinery made by Divine Bros. Co. The unit (Model DLS) is especially suited for polishing contours and flatwork.

It can perform slackbelt operations and jobs requiring backing up of the abrasive belt with a contact wheel or platen. An air cylinder maintains and adjusts belt tension on the tracking pulley. Wide spacing between the two idler pulleys permits polishing sharply contoured work, says Divine.

You can select from several controls, accessories, and alternate arrangements. A pressure regulator, gage, and quick acting lever valve control the belt tensioning air cylinder. The abrasive belt is 132 in. long. Belt width and horsepower are selected for each application.

For further information, *write* Divine Bros. Co., Seward Avenue, Utica, N. Y.



A SINGLE LEVER ON THIS HIGH SPEED LATHE reduces spindle control time and increases productive time. It starts the lathe spindle and selects any speed up to 4800 rpm. The same lever changes the speed during operation and can instantly stop or reverse the spindle. A double bevel bed centers the tailstock in alignment with the headstock. The large bearing area helps prevent below center wear. For further information, **write** Rivett Inc., Brighton 35, Boston, Mass.

Strapping Tool Feeds Directly from Coil

A NEW strapping tool combines tensioning, automatic seal placement, sealing, and scoring of steel strap. The unit (Model 2302) handles ½ and ⅝ in. strap in gages from 0.015 to 0.023 and holds 50 seals in a clip magazine. Seals are automatically fed onto the tensioned strap so that one motion crimps the seal and scores the strap for easy breakoff.

With the continuous take-up on the unit, you can feed strap directly from a coil. Precutting of strap is eliminated.

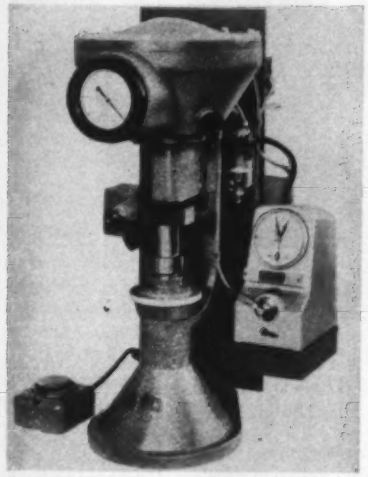
For further information, *write* A. J. Gerrard & Co., 400 E. Touhy Ave., Des Plaines, Ill.

Brinell Hardness Tester Gives Direct Gage Reading

A PRODUCTION line Brinell hardness testing unit has a direct reading gage. A pressure gage at the top of the unit shows the pressure that will be applied before the test is made. The gage is graduated in kilograms of Brinell load. Once the

load is set, any number of tests can be made in rapid sequence.

As the ball penetrates the specimen, its depth is determined by the air gaging principle and the hardness number is indicated on a separate gage mounted on the side of the unit.



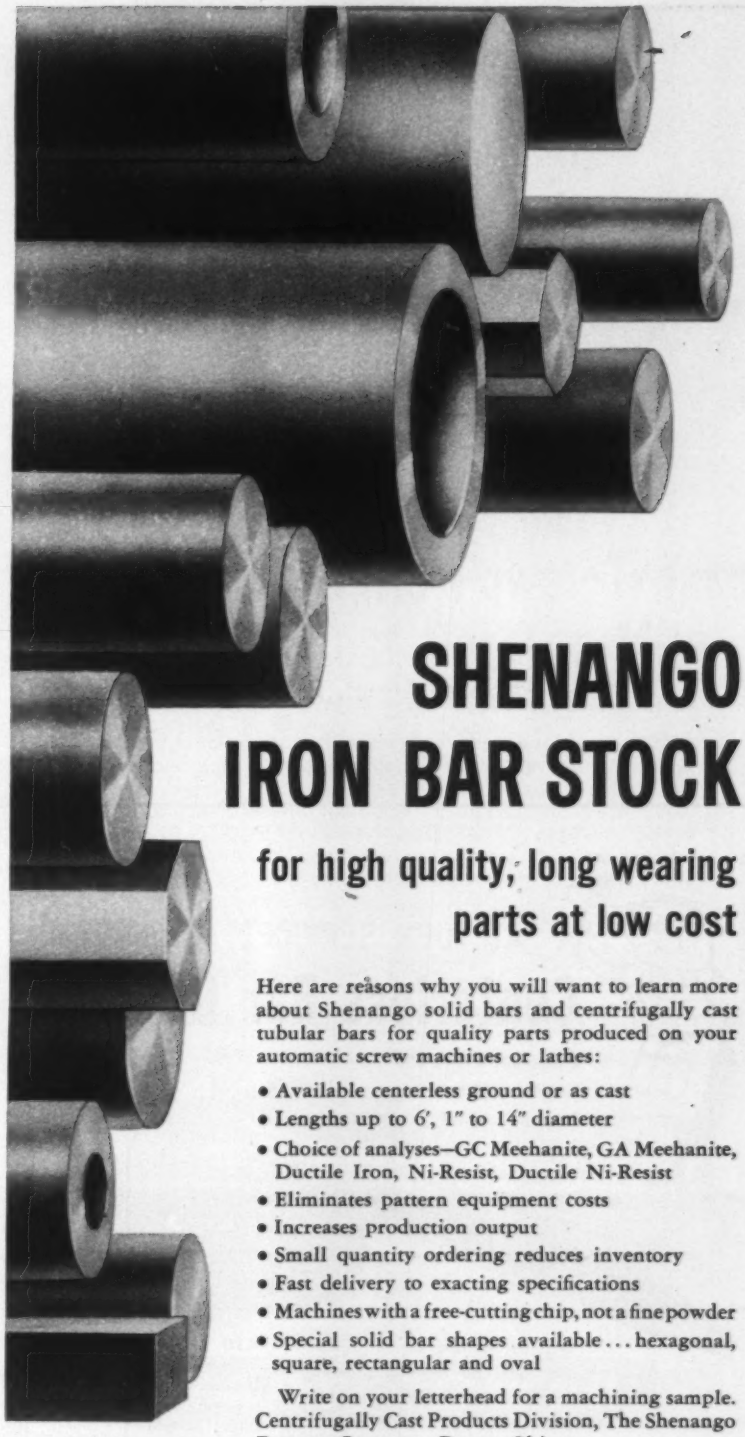
The loading system does not use mechanical linkages, dead weights, or hydraulics. Loading is a function of air pressure. Two standard models are now available. They have a vertical clearance from the anvil to the ball of 9 or 16 in. Each model has a hand wheel supported by a ball thrust bearing, which provides fast, smooth rotation of the screw to adjust anvil height.

For further information, *write* Tinius Olsen Testing Machine Co., 957 Easton Rd., Willow Grove, Pa.

Swiveling Head on Grinder Does Contour Sharpening

AN ECONOMICAL and flexible method of combining heavy stock removal face grinding with secondary contour cuts has been developed by Mattison. It now equips its standard No. 2000 traveling table face grinder with an auxiliary swiveling head for contour sharpening.

The head floats laterally and is controlled by a tracer. Flat parts that require a combination stock removal facing cut and a contour finishing operation can be put on this machine. Straight, flat sur-



SHENANGO IRON BAR STOCK

for high quality, long wearing parts at low cost

Here are reasons why you will want to learn more about Shenango solid bars and centrifugally cast tubular bars for quality parts produced on your automatic screw machines or lathes:

- Available centerless ground or as cast
- Lengths up to 6', 1" to 14" diameter
- Choice of analyses—GC Meehanite, GA Meehanite, Ductile Iron, Ni-Resist, Ductile Ni-Resist
- Eliminates pattern equipment costs
- Increases production output
- Small quantity ordering reduces inventory
- Fast delivery to exacting specifications
- Machines with a free-cutting chip, not a fine powder
- Special solid bar shapes available . . . hexagonal, square, rectangular and oval

Write on your letterhead for a machining sample. Centrifugally Cast Products Division, The Shenango Furnace Company, Dover, Ohio.

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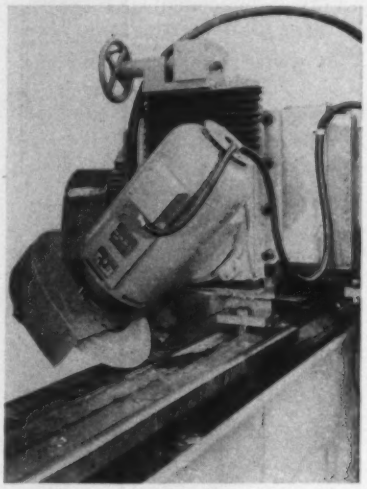


faces, and contour edges or faces can be machined in two easy set-ups.

For further information, *write* Mattison Machine Works, 200 Blackhawk Park Ave., Rockford, Ill.

Electrocleaner Removes Light Welding Scale

AN ALKALINE electrocleaner for steel contains chelating agents. It can remove smut, light rust, oxides, and light welding scale.

The material (Cleaner 808) is a dustless, free flowing powder which is dissolved in water (8 to 10 oz per gallon). Recommended current density: 50 to 75 amperes per square foot at 180 to 210° F. The surfactants present produce a low, controlled foam blanket on the surface of the solution to minimize spray and hydrogen gas explosions.

For further information, *write* Enthone Inc., 442 Elm St., New Haven 8, Conn., a subsidiary of American Smelting & Refining Co.

Titanium Carbide Grade Has Fine Grain Structure

A CEMENTED titanium carbide grade (VR-65) is the first of a series of new cutting tool materials announced by Vascoloy-Ramet Corp. The grade was developed to extend the range of conventional cemented carbides.

Nominal hardness of the material

is 92.1 Ra. It's strength of 175,000 psi is in the range of finishing grades of carbides. The company says one production job on a 300-400 Series stainless (using a throw-away insert milling cutter) is running at 1900 sfpm with 30 cu in. of metal removed per minute with excellent tool life.

For further information, *write* Vascoloy-Ramet Corp., 820 Market St., Waukegan, Ill.

Ultrasonic Cleaner Mechanically Agitated

DIFFICULT cleaning jobs can be done by an ultrasonic cleaner that has mechanical agitation. The unit (Model 1PA-US) has a recirculating pump and filter system that constantly cleans the solution. A temperature control maintains a preset temperature.

The unit is 26 in. long, 29 in. deep, and 56 in. high. The cleaner has a liquid capacity of 30 gallons, load capacity of 75 lb, 18 x 21 in. working platform, and agitation up to 150 strokes per minute.

For further information, *write* Circo Ultrasonic Corp., 51 Terminal Ave., Clark, N. J.

Unit Measures Vacuum, Provides Switching Action

YOU CAN measure a vacuum from 0.001 micron up to 20 microns of mercury (in a continuous reading) on Cenco's discharge vacuum gage and controller without switching the scope.

The gage tube operates on the cold cathode discharge principle. Connected to a 115 volt, 60 cycle line, it is instantly self-starting at any pressure from 760 mm down to 0.001 micron. The controller provides automatic on-off switching ac-

LP-Gas Model HA-3 with recessed housing can be installed on sit-down trucks without seat alteration.

Ready-Power Units Power Trucks At Lowest Cost Per Ton-Mile

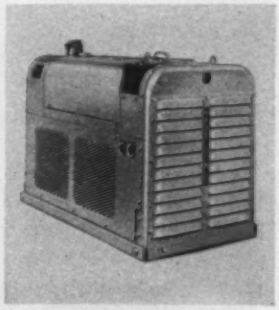
ASSURE FULL-TIME POWER FOR YOUR ELECTRIC TRUCK

It costs you less to move materials when your electric truck is equipped with Ready-Power. The compact Ready-Power Unit consists of a dependable industrial engine and DC generator. It is easily installed or interchanged on practically any make of truck and generates full capacity power whenever needed. There is no power lag, no truck slowdown. Ready-Power also eliminates the constant recharging and replacement of stored power.

Save money and assure full-time power for your materials handling vehicles. Mail the coupon below for complete information on Ready-Power Units.

SERIES HA FOR FORKS UP TO 8,000 LBS., PLATFORMS UP TO 10,000 LBS.

Ready-Power Series HA Units are designed for use with medium size fork, platform and crane trucks. They are available with gasoline or LP-Gas fueling systems, with conventional housing for stand-up trucks or recessed housing for sit-down trucks.



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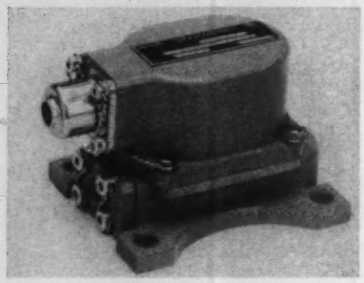
tion for operations performed within or outside the vacuum system.

For further information, *write* Central Scientific Co., 1700 Irving Park Rd., Chicago 13, Ill.

Valve Flow Capacity Is 3 gpm at 3000 psi

A MINIATURIZED, electrohydraulic servovalve weighing 5.12 ounces has a nozzle flapper hydraulic amplifier and a mechanical feedback arrangement. The unit



(Series 30) uses a small, second stage spool and bushing in an aluminum body. Maximum flow capacity is 3 gpm at 3000 psi.

Mounting details follow industry standards. For new applications, the servovalve can be provided with smaller mounting feet with a further weight reduction.

For further information, *write* Moog Servocontrols Inc., East Aurora, N. Y.

Silicone Base Varnish Has Low Curing Temperature

A SILICONE base varnish for use as a protective coating for electronic components reduces moisture absorption and acts as an insulator. The material (Melvar A-100) protects against electrical leakage caused by contaminants and provides additional protection against breakdown at high altitudes.

The varnish has a low curing temperature, high operating temperature, and fungicidal properties. It can be applied by dipping, brushing, vacuum impregnating, or spraying without obliterating component markings.

For further information, *write* Special Products Dept., Melpar Inc., 3000 Arlington Blvd., Falls Church, Va.

Automatic Scrap Shear Prepares 12 Tons an Hour

AN AUTOMATIC, Clearing scrap shear, hydraulically operated, is 21 ft high, 37 ft long, and 14 ft wide. The operating mechanism is designed for outdoor installation.

A vertical main frame houses the main cutting slide, special crushing and holding slide, and all hydraulic cylinders. A special, heavy duty, vibrator type, feeding conveyor brings the unprepared material into the cutting area.

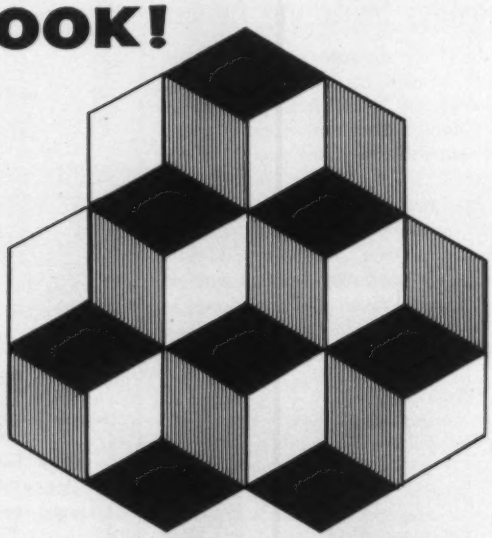
The unit will cut almost any kind of heterogeneous scrap into equal lengths (adjustable in 6 in. increments from 6 to 48 in.). The unit can develop 350 tons of cutting pressure and can prepare up

EXECUTIVE REPORT *17

TAKE A SECOND LOOK!

Are you getting FULL Value for your Abrasive Dollar?

Count the cubes in the figure. You'll see six or seven, depending upon your point of view. Consider the total value of your present abrasive, and compare it with the proven value of Wheelabrator Steel Shot. Not just in price, but in abrasive consumption, cleaning speed, cleaning quality, and equipment maintenance costs as well. From any point of view, the proven quality of Wheelabrator Steel Shot adds up to extra value and extra profit.



Write today for this new handbook of blast cleaning abrasive performance. It's full of charts and facts you can use to help cut abrasive consumption, reduce cleaning costs. Write to Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.

WHEELABRATOR
STEEL ABRASIVES

to 12 tons of scrap an hour.

For further information, *write* Consolidated Mill Supply Co. of Chicago, 5843 S. Loomis Blvd., Chicago 36, Ill.

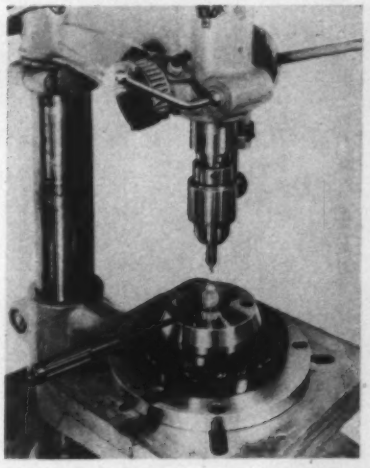
Barrel Finishing Machines Use Vibration, Rotation

TWO small barrel finishing machines (Vibraslide 5 and 10) combine vibration with rotation. The manufacturer says the combination makes it possible to mass finish parts not previously adaptable to barrel finishing.

For further information, *write* Dept. F/O-134, Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.

Collet Chucks Have High Gripping Power

WITH COLLET chucks designated Model 50, you get easy, fast collet changing with capacity increases up to 42 per cent. Runout is no more than 0.001 in. at the nose. Range is 0.100 in. and bar capacity ranges 0.100 to 1.063. It has direct spindle mounting and doesn't need a threading adapter.



The unit can be used to chuck tubing and fragile materials. It can also hold round pieces on drill press tables, milling machine tables, and magnetic chucks.

The device is handwheel operated and has a nose type closure and Rubber-Flex collets.

For further information, *write* Jacobs Mfg. Co., 100 Jacobs Rd., West Hartford 10, Conn.

Shape Cutting Units Guided by Sketches

THREE dual carriage, shape cutting machines have roller drives that remove drive wheels from template tables.

With the new units (CM-56), it is not necessary to protect the template to prevent scuffing or damage to the outline that is being traced.

Drawings can be repositioned without raising the tracing head. The carriage running on the main rails carries another pair of rails supporting the traverse carriage. The combined motion permits any shape to be produced.

Pencil or ink sketches guide the unit. The Linde photocell tracer has an accuracy of ±0.005 in.

For further information, *write*

EXECUTIVE REPORT #18

PROFITABLE FOR DEBURRING

Wherever machined parts are produced, burrs are a costly problem. And burr removal becomes excessively costly when hand labor is required. Wheelabrator *airless* blast deburring equipment, such as the table type illustrated, offers important advantages in cutting the cost of deburring. Its powerful media blast removes burrs uniformly, even from recessed areas, leaving an attractive non-directional finish. Wheelabrators readily fit into automated production lines, eliminate human error, and drastically reduce manual labor.

Over 100 successful deburring applications prove Wheelabrator's cost-cutting ability

A wide variety of Wheelabrator equipment is available for batch type or straight line deburring operations. For engineering consultation without obligation, write to Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ontario.

Write for this Handbook illustrating deburring, deflashing, and cleaning operations with Wheelabrator Equipment. Ask for Catalog 143-D.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

interchangeable with all standard JIC cylinders

With the introduction of the ALL NEW T-J Squair Head, Tomkins-Johnson now offers industry the most complete design range of air and hydraulic cylinders. Presently available in bore diameters from 1-½ to 8 inches, the T-J Squair Head is an interchangeable cylinder which produces maximum force and efficiency, with minimum pressures . . . and is also adaptable to the use of low pressure oil as the working medium. Write today to The Tomkins-Johnson Co., Jackson, Michigan, for Bulletin #SQ 10-58 and complete details.

CHECK THESE 10 POINTS OF T-J SUPERIORITY

1. One Piece Piston
2. Hard Chrome Cylinder Bore and Piston Rods
3. High Tensile Steel Tie-Rods
4. Cushion Adjusting Screw, Externally Adjustable
5. New Super-Cushion for air, or Self-Aligning Master Seal for oil (T-J Patents)
6. Solid Steel Heads and Mounting Plates Standard all Models
7. Port Design Allows Minimum Pressure Drop on Inlet or Outlet
8. Chevron Type, Self-Adjusting Rod Packing
9. Piloted Packing Gland—Absolute Alignment
10. Piston Rod, Extra Strong—Polished and Chrome Plated for Efficiency and Protection

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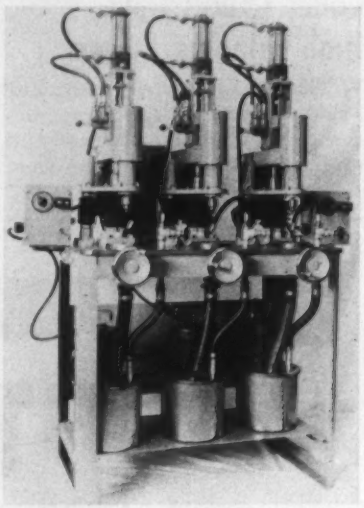
NEW PRODUCTS and equipment

Linde Co., 270 Park Ave., New York 17, N. Y., a division of Union Carbide Corp.

Multiple Spindle Rippers Are Pneumatically Operated

LIGHT AND HEAVY duty automatic spindle rippers for rough finishing tungsten carbide dies are available in single, double, and triple units. They're operated pneumatically, have time switches. The new style head can be adjusted for various size dies and required pressure for adjustable cutting and ripping.



Boron or silicon carbide cutting material is used. An abrasive pumping unit is attached to each spindle ripper.

For further information, *write* Dykrex Corp. of America, P. O. Box 9022, North Station, Newark 4, N. J.

Lathe Does Polishing, Lapping, Spinning, Filing

YOU get continuous, heavy duty service on operations such as polishing, burnishing, lapping, spinning, reaming, and deburring with the Bench model speed lathe.

The spindle nose handles No. 5C draw-in collets up to 1 in. diameter (round), 7/8 in. hex, and 3/4 in.

HERESITE

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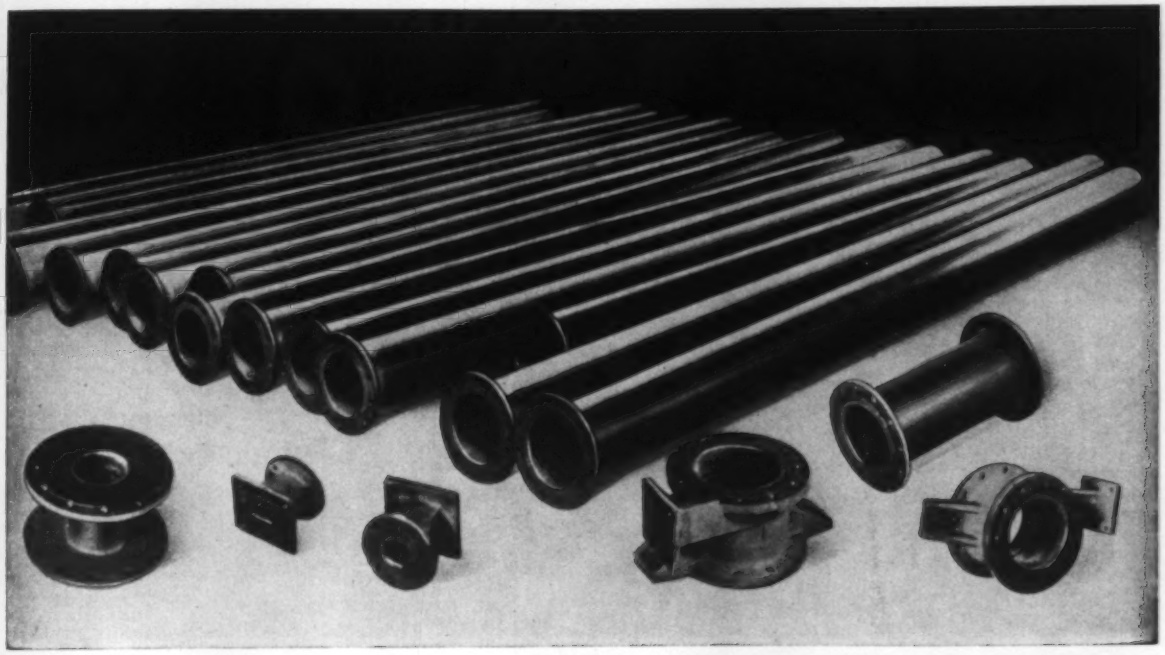
COATED IRON PIPES AND FITTINGS PROTECT YOUR PRODUCTS



Many industries rely on HERESITE PURE PHENOL-FORMALDEHYDE resin lining in steel pipes and steel pipe fittings to control corrosion and commodity contamination.

Since 1942 the oil industry has used millions of feet of pipe which were lined with HERESITE to reduce corrosion fatique.

Catalog No. 60 will be mailed if requested on your letterhead.

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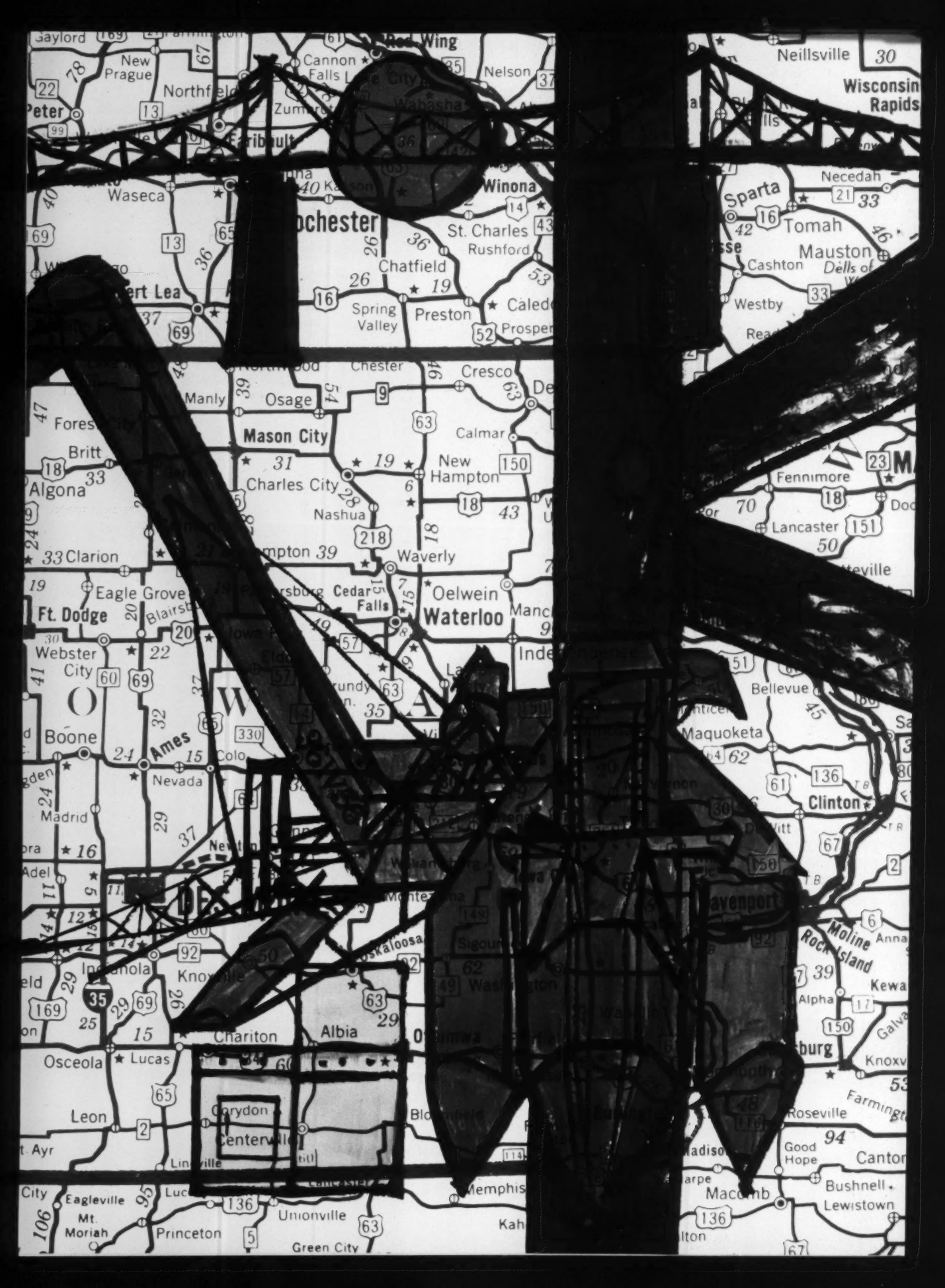
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ONE OF A SERIES DEPICTING MARKET AREAS SERVED BY INLAND • ART BY JACK WOLFGANG BECK

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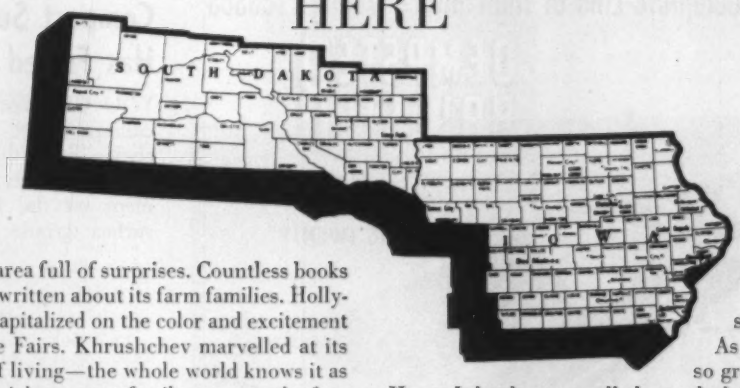

This is an area full of surprises. Countless books have been written about its farm families. Hollywood has capitalized on the color and excitement of its State Fairs. Khrushchev marvelled at its standard of living—the whole world knows it as one of the richest, most fertile areas on the face of the globe. But, what many do not know, is the dramatic industrial growth of this area—an amazing expansion of factories and products the value of which now actually exceeds that of its farm production!

Everywhere, one sees factory additions, huge new plants, great warehouses. From this land and its people come vast quantities of farm machinery and equipment—combines, corn pickers, planters, tillers, tractors, cribs, feeders and brooders. Great structural fabricating companies build bridges, homes, factories, skyscrapers. Famous-brand furnaces, food freezers, washing machines, dryers and home appliances go out to every state of the Union. Manufacturers of heavy duty industrial machinery, yard hoists, derricks, conveyors, pneumatic tools, lathes, graveling machines, road-building equipment, contribute to the wealth of the area and to our economy as a whole.

And everywhere, Inland Steel Company representatives find a hearty welcome. For Inland has served manufacturers in this area—Iowa, the southern half of South Dakota—and Rock Island County, Illinois—since 1893. As they grew, so grew Inland. Here, Inland men called regularly on every customer, large and small—maintained close personal relationships throughout the years—in times of plenty as well as in times of short supply.

The first orders ever received on Inland's books came from Iowa! Today, the original two Iowa customers, now significantly greater in size, continue their customer relationship with Inland.

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For further information, *write* Standard Electrical Tool Co., 2504 River Rd., Cincinnati 4, Ohio.

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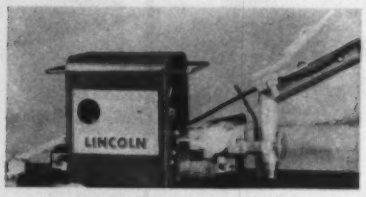
A SELF-PROPELLED trackless carriage has been developed for operation with the Lincoln ML-3 squirtwelder. The unit supports, advances, and guides the gun along the joint to produce automatic submerged arcwelds.

The 37 lb tractor requires no supporting fixtures. The equipment can easily be moved to the job site and quickly placed in operation.



The carriage moves on a pair of rollers at speeds from 7 to 70 in. per minute. Two hardened steel wheels, positioned alongside the rollers, ride in the joint ahead of the arc to guide the carriage.

For further information, *write* Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio.

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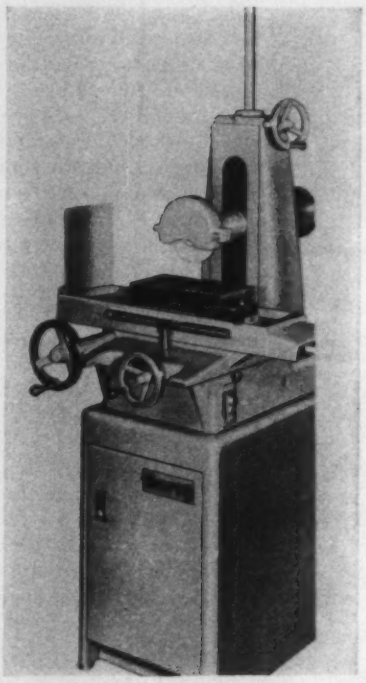

This equipment simplifies operation and maintenance on the compact, low cost unit. Automatic forced lubrication is provided. The company says it can triple life of the ways and preserve original accuracy.

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NEW literature

Write directly to the company for a copy

Freight Handling

Two analysis forms help provide handling and specification data for solving dock layout problems. Also discussed is a system where each employee works alone as a checker, stripper, and loader for increased productivity and more flexible operation. Dept. R 10-21, Lewis-Shepard Products Inc., 125 Walnut St., Watertown, Mass.

Power Transmission

An 8 page pamphlet describes a gearing system using Helicon gears. The system's relation to other types of face gearing is discussed. Spiroid Div., Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.

Gear Shaving Essentials

Information on basic gear production and gear shaving is presented in an 18 page reference manual. Included: Cutting errors, coldwork, and fire distortion; basic shaving characteristics; cutter characteristics, accuracy of shaved gears; and hard gear honing. National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.

High Alloy Castings

Stainless steel and high alloy casting selection, design, and production are covered in an illustrated 64 page booklet. It's divided into three sections: Heat resistant alloys, corrosion resistant alloys, and fabrication data. Applications in 24 industries are illustrated. Readers Service Section, International Nickel Co. Inc., 67 Wall St., New York 5, N. Y.

Manual Hard Surfacing

Bulletin 3100.1 contains basic information about manual hard surfacing. It discusses the economics and metallurgy of the technique, examines the various conditions which require surfacing, and provides information concerning electrode selection and surfacing procedures. Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio.

Stainless Steel Types

A booklet (Adv. 1124) on popular chromium-nickel types of stainless steel (300 Series) contains general information and technical data to help users make correct design and buying decisions. Fabricating, joining methods, and finishing are discussed. Advertising Dept., Republic Steel Corp., 1441 Republic Bldg., Cleveland 1, Ohio.

Joint Compound

A 6 page report containing charts and graphs analyzes service experience and laboratory evaluations of Alcoa's special electrical joint compound for aluminum bus conductors. Aluminum Co. of America, 735 Alcoa Bldg., Pittsburgh 19, Pa.

Torque Tension Testing

A bulletin discusses determination of bolt load through torque tension relationships; obtaining proper bolt load directly with power tools; and checking the reliability of power tool output necessary for consistent tightening of threaded fasteners. Also presented: Tabulated data on ultimate tensile strength of bolts in various materials and sizes. Skidmore-Wilhelm Mfg. Co., 442 S. Green Rd., Cleveland 21, Ohio.

Bearings and Bushings

Data on bearings, bushings, bar stock, and babbitt metal are presented in a 16 page booklet. Six pages are devoted to specifications, chemical composition, and mechanical properties of brass and bronze casting alloys and manganese and aluminum bronze alloys. American Crucible Products Co., 1383 Oberlin Ave., Lorain, Ohio.

Rare Earth Elements

An 8 page brochure contains technical information about chemicals, metals, and alloys in the rare earth group. Properties and chemical analysis of more than 50 produets are listed. Vitro Chemical Co., a subsidiary of Vitro Corp. of America, 342 Madison Ave., New York 17, N. Y.

Optical Comparators

Measuring and inspecting parts by optical comparators are discussed in a 21 page booklet. Jones & Lamson Machine Co., Springfield, Vt.

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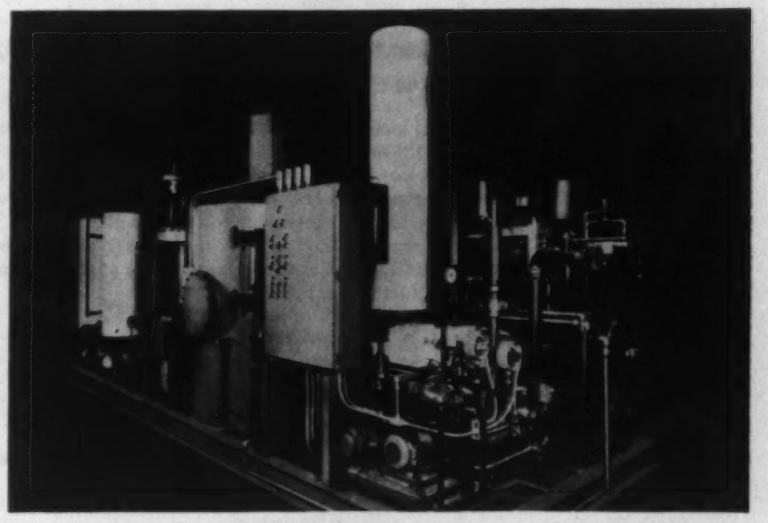

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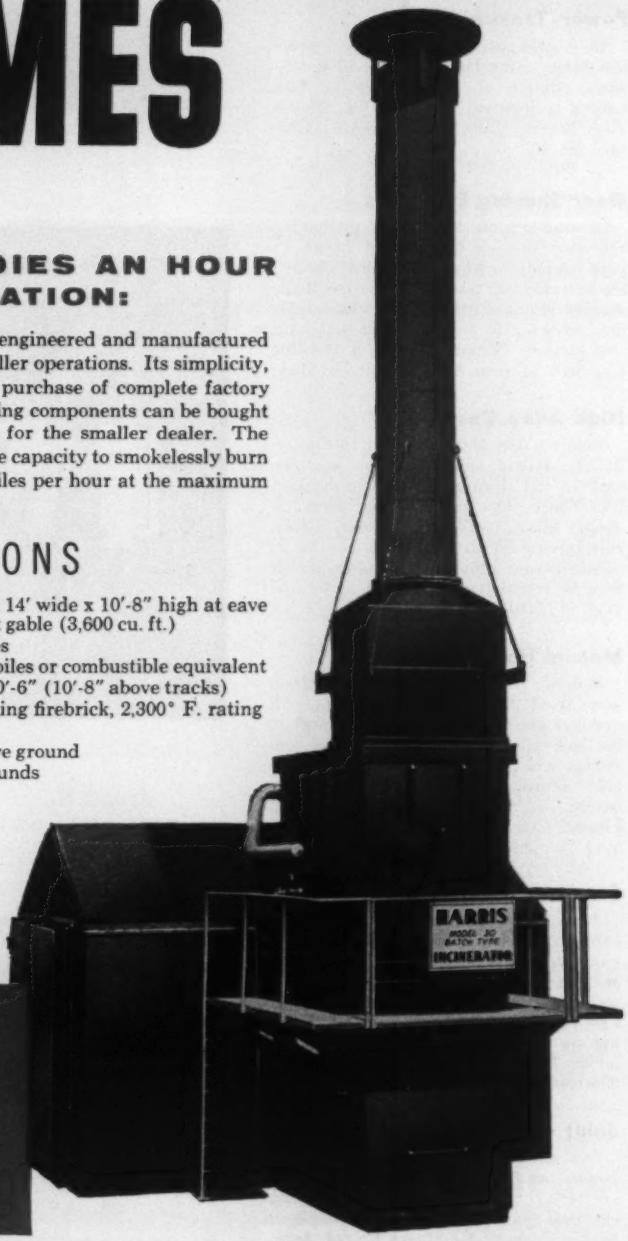

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Inventory Cutbacks to End Soon

STEEL users are continuing to knock their inventories down to minimum working levels, convinced that mills and service centers can meet their requirements in a hurry if necessary.

In the last six weeks, consumers have been exercising unexpected restraint on inventory accumulation. Last month, shipments were about equal to consumption. There was little additional buildup, if any. This month, the tide has turned. Users are chewing up more steel than they're receiving. Next month, they'll continue to liquidate their inventories.

Look for second quarter shipments of about 19 million tons. Adding imports, total receipts of domestic consumers will be about 20 million tons. But consumption will be about 21 million, so inventories will shrink by 1 million tons during the period. You can expect first half shipments of 43 million tons (vs. 48.2 million in last year's strike threatened first half).

FAST START—During the first quarter, consumer inventories increased by nearly 5 million tons. As STEEL predicted more than two months ago (Mar. 14, p. 133), mill shipments from January through March set an all-time record.

Automakers, aiming at record production of 2.25 million cars, took more steel than in any previous quarter: 5.3 million tons. But since they actually turned out only 2 million units, they began second quarter operations with a steel surplus.

As a group, consumers received 23.5 million tons of steel from American mills in the first quarter and 1.4 million tons from foreign producers. Total receipts (24.9 million tons) exceeded consumption by about 5 million tons and boosted inventories from the Jan. 1 level of 13.5 million tons to a Mar. 31 figure of 18.5 million.

BACKLOGS DEPLETED—Thanks to order backlogs that were accumulated during the strike, steelmakers are still shipping at a fairly high rate. In some products, such as hot rolled bars, shipments during the first half of May won't be off as much as new bookings because mills will be busy with tonnage carried over from April. But this much is clear: Steelmakers are scraping the bottom of the barrel labeled "backlog."

INGOT RATE FALTERS—As backlogs diminish and consumers continue to live off their inventories instead of placing new orders, steelmakers are steadily reducing their output. Last week, operations were at 73.8 per cent of capacity; 1.2 points below the previous week's revised rate. Production: About 2,102,000 ingot tons. Look for second quarter operations to average 74.5 per cent of capacity (vs. 94 per cent in the first quarter).

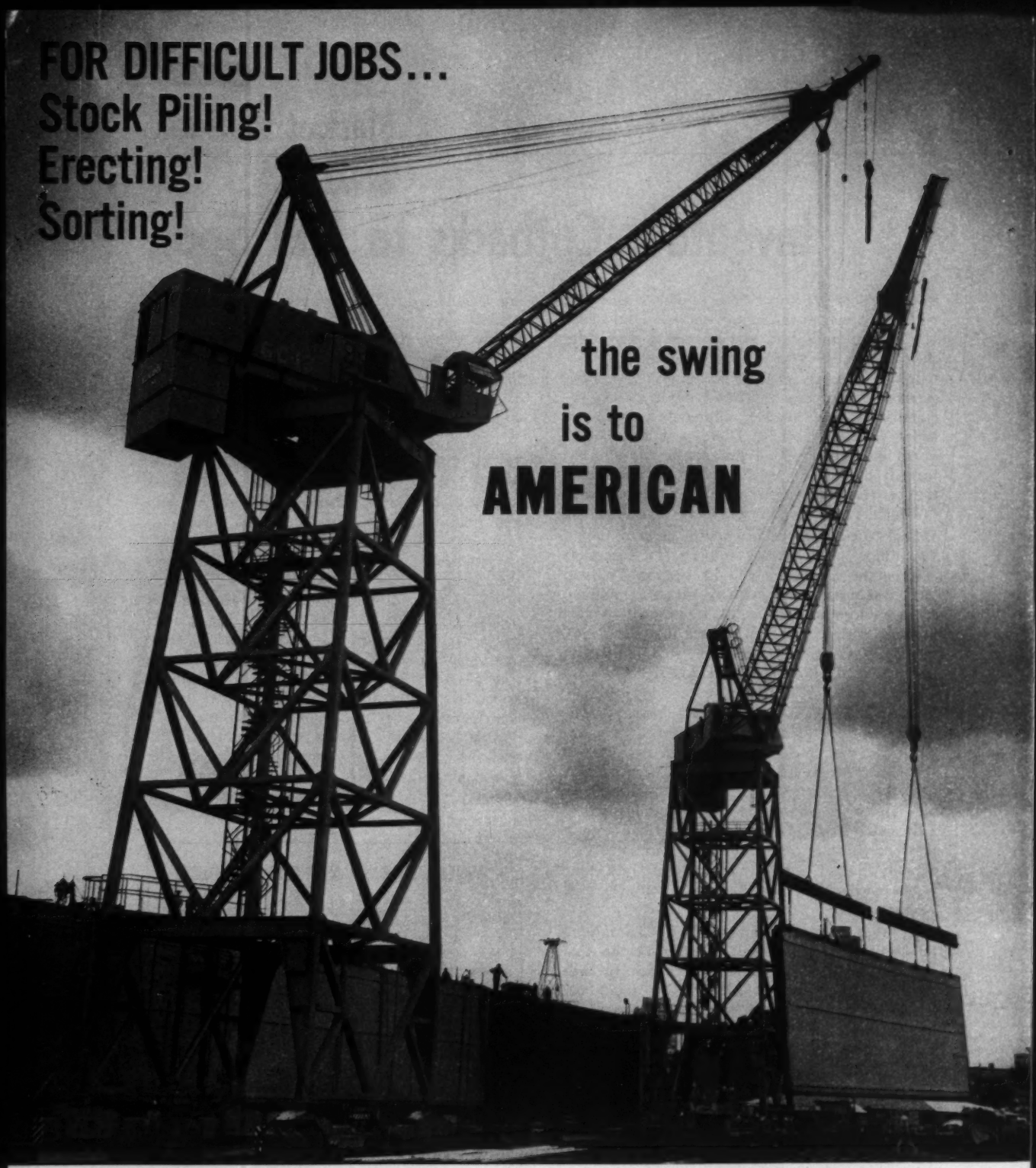
THIRD QUARTER OUTLOOK—Market analysts for the leading steel companies believe consumers will stop liquidating their inventories by July and hold them at about 17 million tons until fall, when there may be a moderate buildup.

With stocks at a relatively low level and users continuing to chew up steel at a rate equivalent to 75 per cent of the nation's finished steel capacity, it's clear that operations can't remain below 75 per cent for long. Nevertheless, third quarter production will probably fall below the second quarter's output. Reasons: 1. Consumption will be low during the automotive model changeover period. 2. Demand for tin plate will decline seasonally. Unless construction activity takes up the slack, you can expect third quarter steelmaking operations to average between 68 and 70 per cent of capacity.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	139	145
Reinforcing	139	146
Boiler Tubes	...	148
Canada	...	151
Charts:		
Finished Steel	...	143
Ingot Rate	142	...
Scrap Prices	...	155
Clad Steel	...	149
Coal Chemicals	...	151
Coke	...	151
Comparisons	...	143
Contracts Placed	161	...
Contracts Pend.	161	...
Electrodes	...	*
Fasteners	...	148
Ferroalloys	...	152
Fluorspar	...	151
Footnotes	...	148
Imported Steel	155	151
Ingot Rates	142	...
Metal Powder	...	151
Nonferrous Met.	158	160
Ores	142	151
Pig Iron	155	150
Piling	...	145
Plates	155	145
Plating Material	...	161
Prestressed Strand	...	148
Price Indexes	...	143
Producers' Key	146	...
R.R. Materials	...	148
Refractories	...	151
Scrap	154	156
Semifinished	141	145
Service Centers	137	150
Sheets	138	146
Silicon Steel	...	147
Stainless Steel	...	149
Steel Shipments	141	...
Strip	138	147
Structurals	155	145
Tin Mill Prod.	...	147
Tool Steel	...	149
Tubular Goods	141	149
Wire	139	147

*Current prices were published in the May 11 issue and will appear in subsequent issues.



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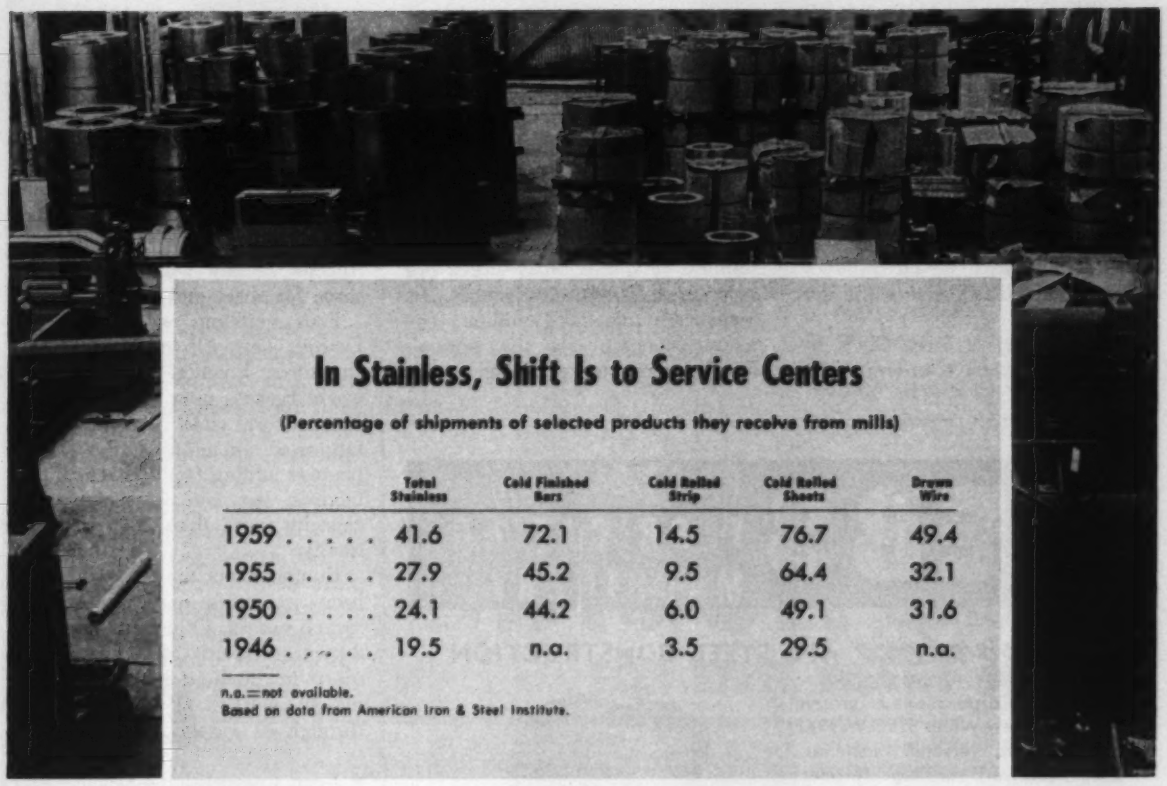

In Stainless, Shift Is to Service Centers

(Percentage of shipments of selected products they receive from mills)

	Total Stainless	Cold Finished Bars	Cold Rolled Strip	Cold Rolled Sheets	Drawn Wire
1959	41.6	72.1	14.5	76.7	49.4
1955	27.9	45.2	9.5	64.4	32.1
1950	24.1	44.2	6.0	49.1	31.6
1946	19.5	n.a.	3.5	29.5	n.a.

n.a.=not available.
Based on data from American Iron & Steel Institute.

J&L to Let Distributors Sell All Stainless

MARKET all J&L stainless steel through steel service centers . . . that's the aim of Project 60, a new program of Jones & Laughlin Steel Corp.'s Stainless & Strip Div., Detroit.

To implement the program, J&L is expanding its storage facilities so it can better meet service center needs.

Presently, 65 per cent of J&L's stainless sheets and bars are sold through distributors, but only 15 per cent of its stainless strip moves through these channels.

The basic reason for the marketing scheme is indicated in the table (above). Since 1946, distributor sales of stainless products in the industry have climbed from 19.5 to 41.6 per cent. Three-fourths of the cold finished bars and cold rolled sheets are marketed through warehouses. Although J&L will continue to make mill sales to qualified customers who request the service, its new marketing emphasis is designed to assist more than 90 distributors, including the parent company's service centers, in selling J&L stainless products. Mill parity pricing will be continued. So will J&L's standard distributor discounts. More warehouses will be added later. Other stainless producers are expected to step up their sales and marketing efforts to meet the move.

• **Project Rundown**—In instituting Project 60 (named for the year), J&L is adopting much the same sort of marketing relationship the auto companies have with their independent dealers. It's a program of technical and promotional assistance. It plans to use Western Union Operator 25 service to channel advertising inquiries directly to service centers. It's preparing readymade direct mail programs for warehouses. (They will feature the distributor's name and facilities rather than J&L's.)

Other support functions include making technical literature available to warehouses for customer distribution, metallurgical services for the distributor's customers, and up to date technical help stemming from information provided by J&L's Advanced Research Laboratories. The division will publish a bimonthly magazine, reporting on new and unusual applications of stainless steel. It will spend $500,000 on trade and business advertising.

• **Allies**—Discussing the program, M. K. Schnurr, division president,

says: "We have created Project 60 to offer our distributors positive action—not head-on competition—to help them build sales. We want our share of the existing market, and we believe our best chance of attaining our goal is through and with the distributors of stainless steel. To my knowledge, this is the first time that a producer of our size has declared itself as a matter of basic policy to be the dedicated ally of the distributor."

The Stainless & Strip Div.'s six electric furnaces have an annual ingot capacity of 300,000 tons, about one-sixth the stainless capacity in the country. It usually ranks seventh or eighth in sales of stainless products.

Rolling mills are at Detroit, Indianapolis, Los Angeles, Youngstown and Louisville, Ohio, and Kenilworth, N. J. The division produces more than 50 different grades of stainless bars, rods, wire, sheets, and strip in different size ranges. Its investment totals $64 million. The parent company is the nation's fourth largest steel producer, with a total ingot capacity of 8,125,000 tons annually.

• **Expansion**—In support of Project 60, the division is adding $1 million worth of storage space and production facilities. Most of the expansion is taking place in Detroit, but the sheet storage capacity of the Louisville plant will be tripled. The Los Angeles facility will boost storage space for sheet and bar stocks.

Four buildings were erected at Detroit. They fill in between other structures. Erection took only two weeks because most of the 500 tons of structural steel had been prefabricated. In addition, the Detroit plant is adding facilities which will increase bar and wire production capacity more than 4800 tons annually.

Rumors about the J&L move have been circulating in the industry for several weeks. Other stainless producers are keenly interested, particularly in the division's plans to ultimately market all stainless strip through its warehouse outlets.

• **Keen Competition**—Because the trend toward service center distribution of stainless is unmistakable, mills are competing strenuously for new distributors. Steelmakers in Pittsburgh know that they must have well stocked distributors in Chicago if they expect to sell Chicago consumers. As one market analyst explained: "The best delivery we can promise on a 2000 lb order on 2 in. rounds would be four to six weeks. What chance do we have of making the sale if the customer is in a hurry and some Chicago warehouse can ship him what he needs this afternoon?"

It's estimated that about 425 service centers stock stainless, and most of them have two or three mill suppliers. Consumers with varied requirements are delighted that mills are establishing more outlets. Reasons: 1. They don't have to tie up their own money in inventories. 2. They don't have to pay any more for service center stainless than for shipments direct from the mill.

• **Competitors' Views**—Steel industry observers view J&L's move as an indication that the company isn't satisfied with its coverage. Says a competitor: "Although J&L has national distribution through its own

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warehouse division, it probably doesn't have the saturation it would like. It has good distribution of billets and bars because its Detroit plant, formerly Rotary Electric Steel Co., has been selling through service centers for years. But J&L is relatively new in flat rolled stainless, and it's a tough market to crack."

• **Aiming at Strip**—The most interesting feature of J&L's move is its apparent intention of selling most of its strip through distributors. Strip has long been considered a mill product because customers are fussy about tolerances, and it's unusual when two of them in the same area have the same requirements. What's more, distributors get only a 5 per cent discount on strip (vs. 10 per cent on sheets and bars). Few of them have considered it worth while to handle the product on that basis. (Although the "official" discount is 5 per cent, some mills are reportedly offering more than that.)

Commenting on the J&L plan, one competitor declared: "It might be a good sales gimmick to get the product closer to the customer. Some users are certainly going to be happy if there's a guy in the neighborhood who will stock what they need and ship it in small quantities. But we don't expect a big switch to service center distribution of strip. Many buyers will prefer to deal directly with the mills because they have specialized needs and have built up strong relationships with their suppliers. A customer who has long production runs and isn't scheduled on a day-to-day basis has nothing to gain by dealing with a middle man."

• **Tailored Product**—Also skeptical, another producer points out that strip is "essentially tailormade" and "doesn't lend itself to stocking because it's seldom acceptable to more than one customer." The product that must withstand stretch bending in automotive applications is entirely different from the strip that's used in knife blades or roll formed in the appliance industry.

Another marketing man claims that his company isn't worried about the J&L move "because the old argument about buying from a supplier who is also your competitor doesn't influence service centers the way it once did."

• **Stocked with Strip** — When it comes to speed of delivery, strip producers point out that they're stocking bigger inventories of semi-finished and finished material than ever before. Says one: "Customers in Detroit can get two week delivery of top quality automotive molding stock from almost any mill in the Pittsburgh area. It's pretty unusual when they need better service."

Stainless producers interviewed by STEEL were of one mind: "The J&L program certainly isn't going to change our way of doing business."

Distributors . . .

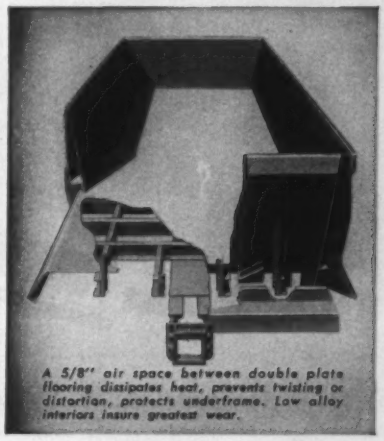
Prices, Page 150

Steel service centers are overflowing with stocks of practically all major products. Mills were shipping large tonnages earlier in the year (principally for replenishing distributors' stocks) and are now making prompt shipments to cover spot needs. Only a few weeks ago, cold rolled flat and galvanized products were in tight supply; now they are as readily available as other products.

While supplies have been increas-

MAGOR AIR DUMP CARS

FOR STEEL PLANT SERVICE



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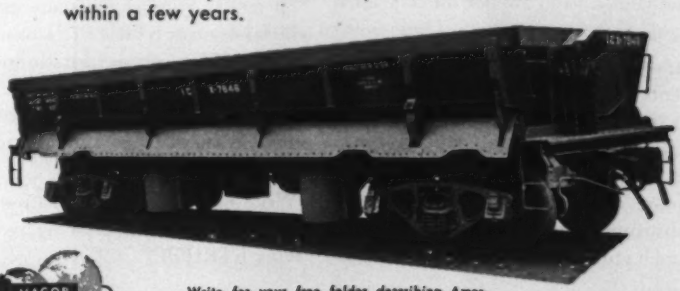

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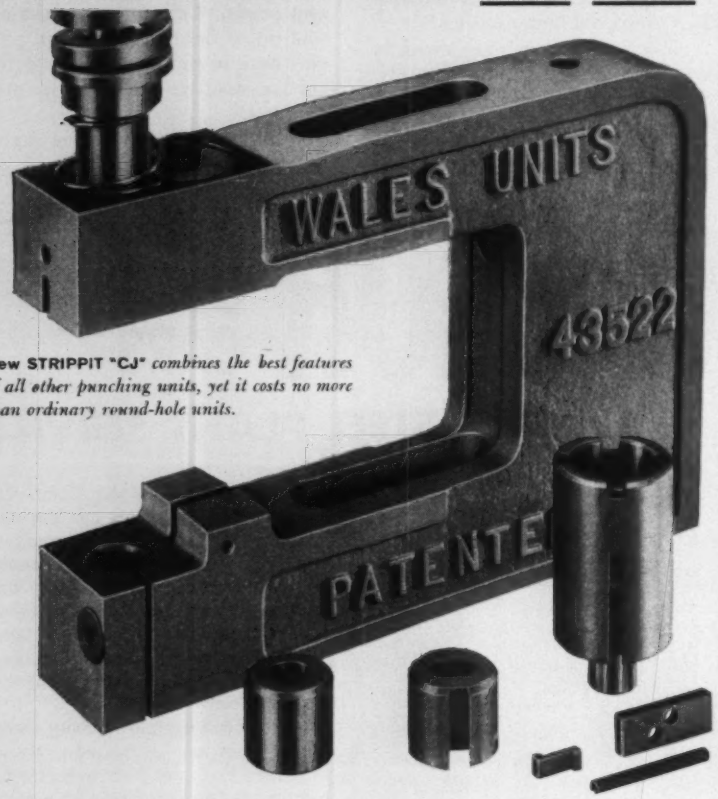

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ing, users have been reducing their receipts. Part of this lag is attributed to a heavy withdrawal from their stocks which can be maintained at a lower level in view of assurance of prompt shipments from their suppliers. As a measure of the reduction in activity at service centers, distributors are operating their flame cutting and other fabricating equipment at only about 60 per cent capacity.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 146 & 147

While flat rolled steel producers are beginning to see a revival of buying activity, little of the new business is for May delivery. Result: Steelmakers forecast a continued decline in ingot production. Shipments of sheets and strip will be substantially below last month's and may even fall to the lowest level of the year.

There's a chance for a slight pick-up in June. Automakers have been ordering steel for 1961 model die tryouts, but they haven't booked much tonnage for production runs. Inventories of auto part suppliers vary widely. Some firms are overstocked, but others have been coming into the market periodically for additional tonnage.

More producers of cold rolled strip are moving into specialties, dropping carbon steel, including cold finished spring grades. Example: Wallingford Steel Co. is limiting its production to stainless, supermetals, and high temperature alloys. Slitters are taking over an increasing volume of low carbon strip business.

Most producers of bandsaws are coming out with something new. Also, several metalworking shops are diversifying by adding a bandsaw line.

In general, sheet deliveries continue easy in all consuming areas. Hot rolled sheets are available in two to four weeks and cold rolled in four to six. There are some openings in galvanized rolling schedules for June.

So far, there is little interest noted in third quarter needs. Despite the lag in demand, sheetmakers look for fairly good operations the remainder of this quarter. Cancellations and order pushbacks have diminished, and most users have pared their inventories sharply.

Steel Bars . . .

Bar Prices, Page 145

Consumers of hot rolled carbon bars are keeping new commitments close to needs. Some are liquidating inventories, having overestimated their first half requirements. They are living off stocks, buying only fill-in tonnage as required.

Mill deliveries are extremely competitive, with most producers offering to ship within two to three weeks.

Because it had a big poststrike backlog, a leading supplier was able to ship at a near capacity rate last month. Thanks to a substantial carryover, its May shipments probably won't fall below 75 per cent of capacity. However, new bookings are dropping at a much faster rate, making it virtually certain that June shipments will fall precipitously.

Automakers haven't started ordering for their 1961 models, but some are placing additional tonnage to wind up production of this year's cars. Chrysler Corp. made an additional buy for May.

Service centers are well stocked. Cold finishers took heavy shipments through April and then got some big cancellations from their customers. Result: They wouldn't know where to put more steel if it were delivered. Hot mill officials, however, think the congestion will soon be relieved.

Some observers think the drop in cold finished demand may be leveling off.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 146

The seasonal pickup in building has not been as robust as had been expected. As a result, reinforcing barmakers are not under unusually strong pressure for deliveries. Order backlogs are down, and some easiness in prices has appeared, notably in coastal areas where domestic bars meet stiff competition from foreign material. Last week, a Texas producer reduced his prices slightly. Considerable public work is before the market, and reinforcing steel awards should increase as construction contracts are let.

Wire . . .

Wire Prices, Pages 147 & 148

Merchant wire items can be had

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CUT ANNEALING COSTS 50%, IMPROVE STRIP QUALITY

New General Electric Stainless Strip Furnace* eliminates pickling, produces steel up to six times faster than other bright annealing furnaces.

Important design innovations on General Electric's new continuous bright annealing furnace now make possible annealing cost reductions up to 50 percent, as well as improved corrosion resistance, surface appearance, and physical properties of the strip.

These money saving benefits are made possible by the new design principles of *direct radiation heating* and *jet cooling*, which allow faster production speeds than ever before possible with this type of furnace. The furnace can achieve such typical production rates as 7700 lbs/hr of 24-inch strip, even more for wider strip.

FASTER HEATING—The new heating section design utilizes molybdenum units mounted on high-purity brick, backed by a special insulation. Heating is by direct radiation without muffles. Thus, faster, more uniform heating is achieved.

FASTER COOLING—Jet coolers, driven by gas-tight motors, direct streams of hydrogen at right angles against the strip for faster, uniform cooling with minimum grain growth and carbide precipitation.

LOWER COSTS—Less downtime is required, no metal muffles are needed, and you get up to six times more production, compared with other bright annealing furnaces. There's no acid maintenance, replacement, or disposal as in conventional anneal and pickle operations. Annealing costs can thus be reduced as much as 50 percent.

HIGHER QUALITY STRIP—Vertical construction reduces hot strip tension and improves appearance. Since furnace has only one roll which does not touch hot strip, surface scratching is eliminated. Faster heating and cooling rates also improve corrosion resistance and physical properties.

Find out today how the new General Electric Stainless Steel Furnace can increase production, improve strip quality, and save you money in your annealing operations. Contact your G-E Sales Engineer, or write for new bulletin GED-4124. General Electric Co., Schenectady 5, New York. 756-03

* Patents Pending.

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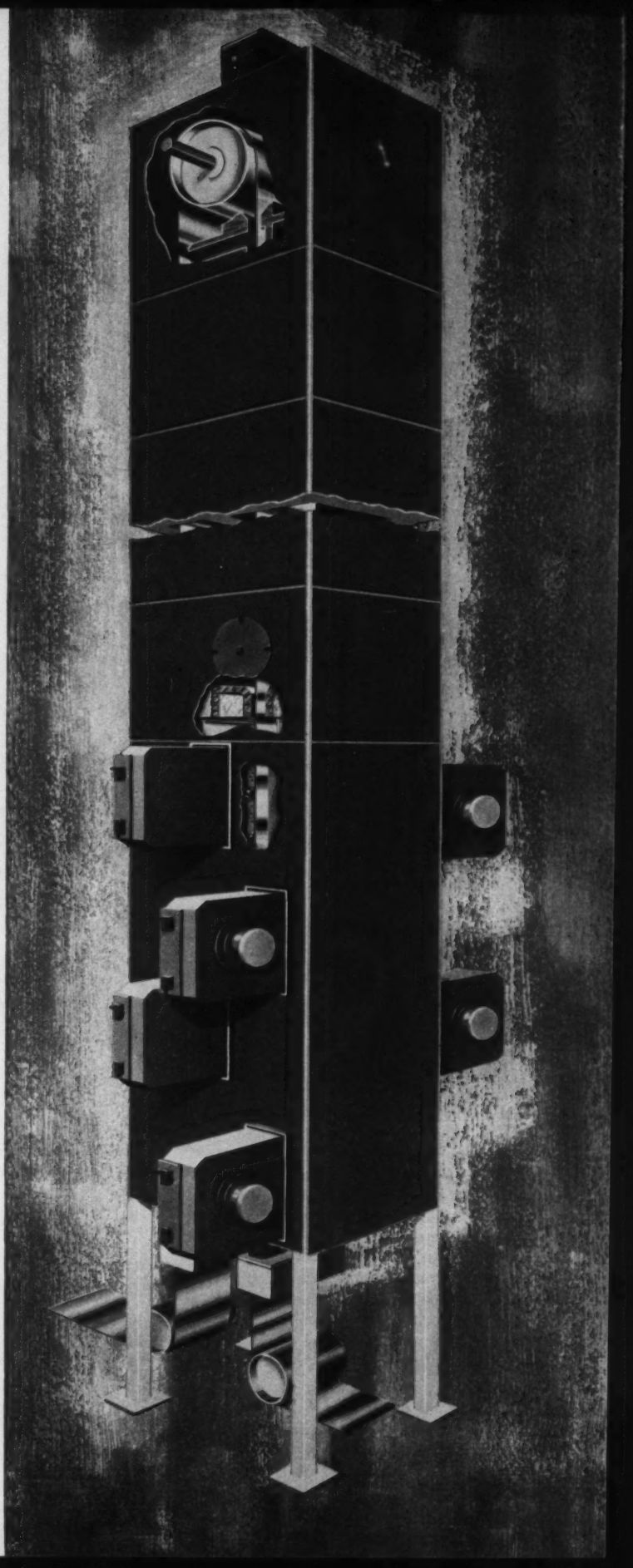

from stock, and at the outside, deliveries run no more than two weeks or so. Manufacturers' wire is available for shipment within 30 days. Domestic mills continue to report severe competition from abroad. Foreign mills are estimated to supply 80,000 tons of nails out of total requirements of 115,000 tons in the seven Far Western states.

Steel Shipment Records Fall in First Quarter

Shipments of finished steel products in the first three months of this year set a first quarter record of 23,966,967 net tons, reports the American Iron & Steel Institute. The previous high: 23.3 million tons in 1956. The all-time high for a quarter (27.3 million tons) was set in the second three months of last year.

More steel was shipped direct from the mills for automotive uses during the first quarter this year than in any previous quarter. The total was 5,310,785 net tons vs. the previous high of 5.2 million in the second quarter of 1959.

Shipments of cold rolled sheets (4,647,926 tons) also set a record for any quarter. The former high (second quarter last year) was about 26,000 tons less.

March shipments amounted to 7,965,881 net tons vs. 7.6 million during February.

Comparative shipments of principal finished steel products by market classifications during the first quarters of 1960 and 1959 follow:

	1st Quarter 1960	1st Quarter 1959
Markets	Net Tons	Net Tons
Automotive	5,310,785	4,714,570
Warehouses	4,401,371	3,741,165
Construction	2,837,691	2,492,161
Containers	1,979,795	1,890,128
Machinery, etc.	1,440,586	1,282,488

The table compares shipments of major finished steel products during the first quarter and the same period last year:

	1st Quarter 1960	1st Quarter 1959
Products	Net Tons	Net Tons
Sheets, cold rolled	4,647,926	4,225,560
Sheets, hot rolled	2,849,461	2,442,180
Bars, hot rolled	2,603,918	2,104,881
Plates	2,251,573	1,718,047
Structurals	1,634,542	1,235,610

Tubular Goods . . .

Tubular Goods Prices, Page 149

Despite better weather, standard pipe producers report no visible improvement in their sales. In one leading maker's opinion, business is "just limping along." Standard pipe mills ran at less than half of their capacity in April, and there's little likelihood of a pickup this month. Seamless pipe bookings will probably hit 60 per cent of capacity, but buttweld entries may not exceed 40 per cent.

The big problem seems to be that after the strike many distributors got a lot more pipe than they expected much sooner than they had planned. Now they're trying to digest some of the surplus.

Although oil well drilling has picked up moderately in the last few weeks, there has been no corresponding improvement in sales of oil country goods. Users have working inventories and are well aware they can get quick deliveries from downriver terminals. They could save 4 per cent by ordering direct from the mills, but many are apparently convinced it would cost them more than 4 per cent to carry their own inventories. Last month, a leading tubemaker sold only 20 per cent of his capacity for oil country goods. The outlook for May is similarly discouraging.

Rotary drilling activity increased by 13 rigs for the week ended May 2, with 1809 rigs in operation, reports the Hughes Tool Co.

Line pipe sales leave much to be desired, but they're healthier than sales of standard pipe.

McKay Machine Co., Youngstown, has received an order for two electricweld tube mills and auxiliary processing and handling equipment for a $3 million expansion at Copperweld Steel Co.'s Ohio Seamless Tube Div., Shelby, Ohio.

Semifinished Steel . . .

Semifinished Prices, Page 145

The slump in steelmaking operations is unchecked. Last week the national ingot rate fell 1.2 points to 73.8 per cent of capacity vs. 75 the preceding week. A month ago operations were reported at 78.1 per cent, and a year ago at 92.9.

Significantly, the current 73.8 per cent is equal to an index of 130.9 based on average operations in 1947-49. Output for last week totaled about 2,102,000 net tons, vs. 2,137,000 the week preceding, 2,225,000

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COIL LIFTER

SAVES STORAGE SPACE...

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1 Lifter Handles Both Wide and Narrow Coils With Same Speed and Economy

This C-F Coil Lifter, under control of the Crane operator handles hundreds of coils a day in a large mill . . . wide, narrow, and of varying tonnage. Fast, infinite adjustments of the motorized legs permit quick pick-up and set-down. Legs can be opened to any width and held . . . no need to open to maximum width to handle narrow coil. Maximum of 12" required between coils of any width—saves storage room.

Positive tong grip on coil tightens as lift is made . . . insures safe handling. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for Bulletin and complete information.

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a month ago, and 2,631,000 a year ago.

Declines were registered last week in the Northeastern District, Pittsburgh, Youngstown, Detroit, Chicago, St. Louis, and the West. An increase was reported at Cleveland, while the rates held unchanged at Buffalo, Cincinnati, and the South.

Most of the mills have built up satisfactory stocks of semifinished and this is causing producers to further reduce their ingot output. Further reductions are anticipated over the remainder of this quarter, and beyond. Hot weather and vacations will hold down operations in July and August.

Iron Ore . . .

Iron Ore Prices, Page 151

Stocks of iron ore in the U. S. and Canada at the end of March totaled 41,836,101 gross tons, reports the American Iron Ore Association. The total was down 646,595 tons from the 42,482,696 tons held at the start of the month. At the end of March a year ago, stocks amounted to 44,842,481 tons.

Consumption in March (U. S. and Canada) totaled 12,419,427 tons. That compares with 12,071,858 in the same month a year ago. First quarter consumption amounted to 36,725,791 tons vs. 32,575,501 in the like period of 1959.

At the end of March, 237 blast furnaces were operating, of which 223 were in the U. S. and 14 in Canada. A year ago, 236 stacks were engaged, 224 in the U. S. and 12 in Canada. There are 273 stacks in the U. S. and Canada, 258 in the U. S. and 15 in Canada.

Shipments of Lake Superior iron ore in April (U. S. and Canada) totaled 5,645,840 gross tons, reports the American Iron Ore Association. The total was 2,667,817 tons greater than the 2,987,023 tons moved in April, 1959.

The movement to May 1 amounted to 5,673,911 gross tons, up 2,695,888 tons compared with the 2,978,023 tons moved to May 1 in the 1959 navigation season.

Iron Ore Statistics—March, 1960

Stocks of Iron Ore in the U. S. and Canada—March, 1960
(Gross tons)

	U. S. Ores		Canadian Ores		Foreign	
At Furnaces:	L. Superior	Other	L. Superior	Other	Ores	Total
Start of Month	19,434,116	3,639,129	1,084,328	4,206,319	14,118,804	42,482,696
End of month at						
Mass., N. Y.	1,275,520	48,047	29,950	74,171	303,449	1,731,137
Pennsylvania	3,899,640	290,187	27,261	293,430	5,957,830	10,468,348
Md., Va., W. Va.	99,529	3,832	21,523	1,255,015	2,562,218	3,942,117
Ky., Tenn., Tex.	180,410	275,682	.....	186,521	133,822	776,435
Alabama	871	1,821,724	.....	129,208	3,357,287	5,309,090
Ohio	2,915,661	64,221	403,857	1,103,327	839,730	5,326,796
Indiana	2,506,090	1,655	186,222	.....	77,086	2,771,053
Illinois	1,626,250	11,147	13,968	.....	162,623	1,813,988
Mich., Minn.	1,392,725	.....	76,480	64,209	168,002	1,701,416
Colo., Utah, Calif.	.....	1,116,626	.....	.....	32,693	1,149,319
Undistributed	594	3,059	.....	.....	404	4,057
End of Month	13,897,290	3,636,180	759,261	3,105,881	13,595,144	34,993,756
At U. S. Docks	1,354,275	.....	146,628	1,557,060	2,405,515	5,463,478
Total U. S.	15,251,565	3,636,180	905,889	4,662,941	16,000,659	40,457,234
At Canadian Furnaces:						
Start of Month	1,086,048	.....	194,624	581,760	27,688	1,890,120
End of Month	843,191	.....	146,991	373,985	14,700	1,378,867
Total U. S.-Canada	16,094,756	3,636,180	1,052,880	5,036,926	16,015,359	41,836,101

Consumption of Iron Ore in the U. S. and Canada—March, 1960
(Gross tons)

	U. S. Ores		Canadian Ores		Foreign	
In U. S.:	L. Superior	Other	L. Superior	Other	Ores	Total
Mass., N. Y.	528,636	77,590	31,831	112,159	63,224	813,440
Pennsylvania	1,185,228	245,958	552	146,637	1,258,807	2,837,182
Md., Va., W. Va.	68,331	41,661	9,646	306,067	611,445	1,037,170
Ky., Tenn., Tex.	44,943	91,803	.....	61,913	46,956	245,615
Alabama	.....	480,895	.....	.....	199,409	680,304
Ohio	1,253,933	70,651	132,534	416,554	346,372	2,220,044
Indiana	1,189,670	8,595	158,607	.....	78,427	1,435,299
Illinois	941,594	18,762	7,454	.....	94,968	1,062,778
Mich., Minn.	582,900	.....	39,623	179,487	51,081	853,091
Colo., Utah, Calif.	.....	588,678	.....	.....	14,214	602,892
Undistributed	139	252	.....	.....	18	409
In U. S.:						
Blast furnaces	4,007,429	959,991	308,685	751,955	1,082,414	7,110,474
Steel furnaces	120,673	64,304	2,496	4,764	686,204	878,441
Sintering	1,667,237	598,823	69,066	466,118	991,883	3,793,127
Miscellaneous	35	1,727	.....	.....	4,420	6,182
Total U. S.	5,795,374	1,624,845	380,247	1,222,837	2,764,921	11,788,224
In Canada:						
Blast furnaces	199,574	.....	110,411	172,519	.....	482,504
Steel furnaces	3,815	.....	.....	18,994	12,988	35,797
Sintering	39,462	.....	19,001	54,382	.....	112,845
Miscellaneous	6	.....	51	.....	.....	57
Total Canada	242,857	.....	129,463	245,895	12,988	631,203
U. S. & Canada	6,038,231	1,624,845	509,710	1,468,732	2,777,909	12,419,427

Data from American Iron Ore Association.

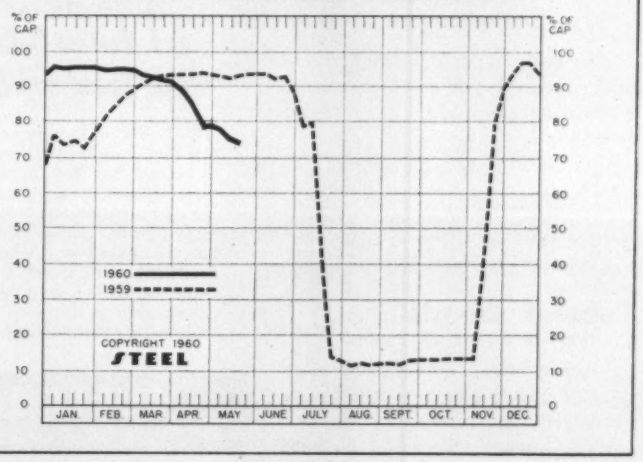
DISTRICT INGOT RATES

(Percentage of capacity utilized)

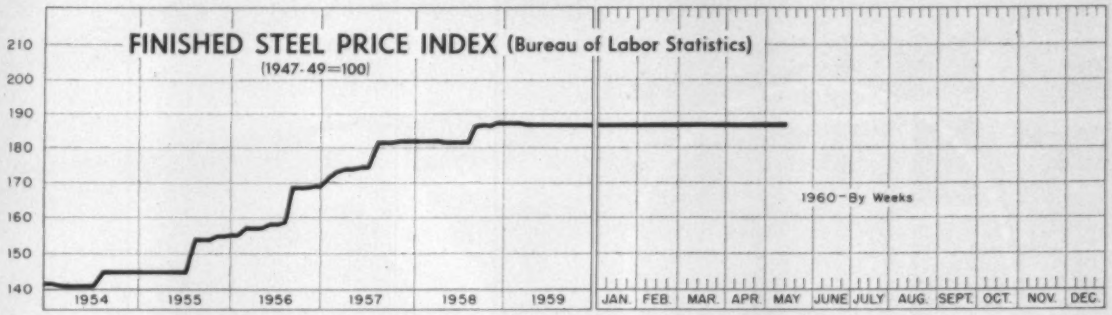
	Week Ended May 15	Week Ago	Month Ago	Year Ago
Northeastern	76	81	79	92
Buffalo	78	78	88	99
Pittsburgh	75	76	79	95
Youngstown	50	52	64	86
Cleveland	77	74	90	97
Detroit	95	97	52	96
Chicago	75	76	86	92
Cincinnati	84	84	100	85
St. Louis	85	88	85	109
Southern	77	77	76	91
Western	69	73	72	94
Total Industry	73.8	75.0	78.1	92.9
Index (1947-49=100)	130.9	133.0	138.5	163.8
Net Tons (In thousands)	2,102	2,137	2,225	2,631

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



May 10, 1960	Week Ago	Month Ago	Apr. Index	Year Ago
186.8	186.8	186.8	186.8	186.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.765
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.585
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.825
Wire, Barbed (80-rod spool)	8.766
Woven Wire Fence (20-rod roll)	21.880

STEEL's FINISHED PRICE INDEX*

	May 11 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$118.45
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	33.33	33.33	33.67	33.33	34.83

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 11 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	4.675

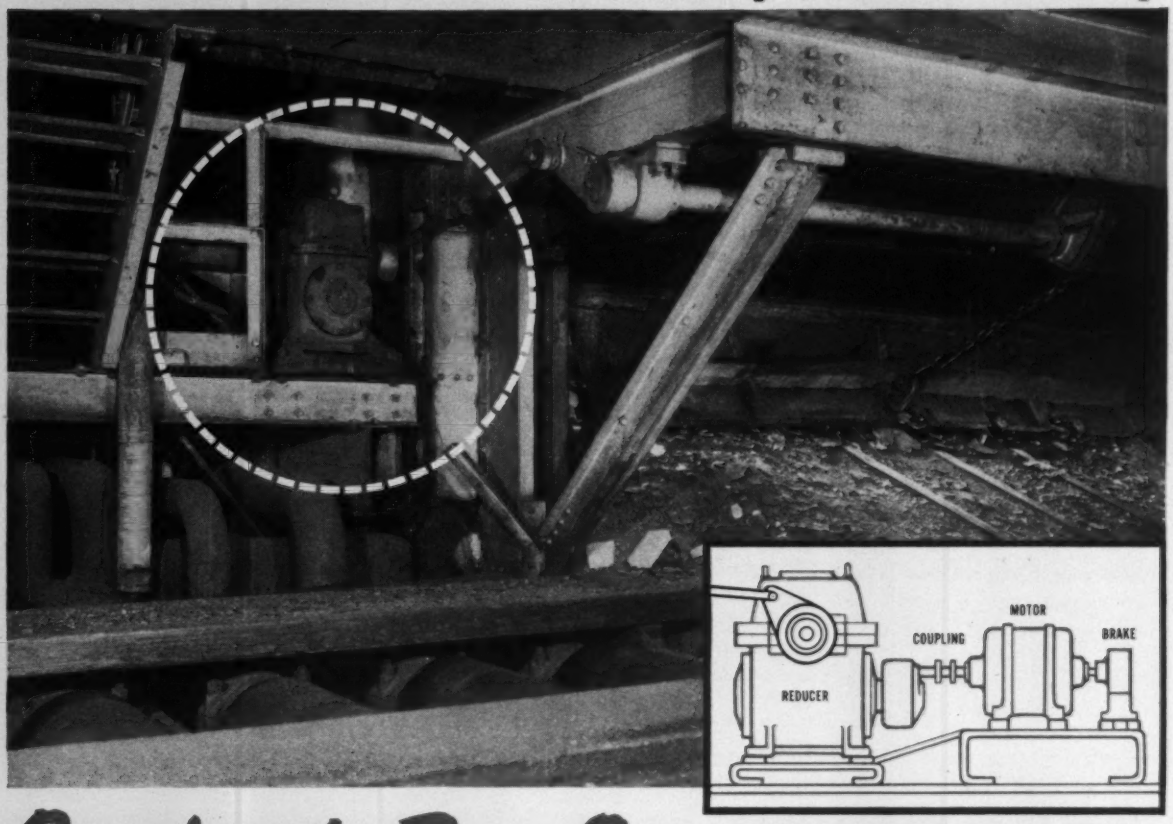
PIG IRON, Gross Ton	May 11 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$33.50	$33.50	$34.50	$34.50	$34.50
No. 1 Heavy Melt, E. Pa.	35.00	35.00	35.00	33.50	36.00
No. 1 Heavy Melt, Chicago	31.50	31.50	31.50	32.00	34.00
No. 1 Heavy Melt, Valley	35.50	35.50	36.50	35.50	34.50
No. 1 Heavy Melt, Cleve.	32.50	32.50	33.50	33.50	31.50
No. 1 Heavy Melt, Buffalo	30.50	30.50	30.50	31.50	30.50
Rails, Rerolling, Chicago	52.50	52.50	53.50	55.50	52.50
No. 1 Cast, Chicago	42.50	42.50	45.50	46.50	40.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

Foote Bros. Drives In The Primary Metals Industry



Opening the Door On TOMORROW

Every time this Foote Bros. Worm Gear Reducer operates, "tomorrow" . . . and the promise it brings of better living for more people, comes a little closer.

Installed in the modern 44″ Hot Strip Mill at Inland Steel Company's Indiana Harbor plant, this Reducer opens one of two discharge doors on the No. 4 Reheat Furnace to begin the process of converting red hot slabs into coils of sheet steel which will be used by Inland's customers to produce better products for better living for more people. Another Foote Bros. drive is used to open the other door.

Steelmaking calls for rugged, dependable equipment and Foote Bros. Reducers meet these requirements in every respect. Precision generated gearing, heavy duty shafts and high capacity bearings are all designed to provide the kind of trouble-free service required in today's high speed steelmaking operations. Maintenance men have no trouble with the many Foote Bros. Drives at work in the Inland plant because these drives are built for "no downtime" service.

There's a Foote Bros. Drive for your power transmission requirements. Ask your nearby Foote Bros. Authorized Distributor for information or assistance concerning your power transmission problems. He's ready to help you.

FOOTE BROS. GEAR AND MACHINE CORPORATION

4583 South Western Boulevard, Chicago 9, Illinois

POWER TRANSMISSION DRIVES

Steel Prices

Mill prices as reported to STEEL, May 11, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 146, footnotes, page 148.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 126.00
Detroit S41 .....119.00
Economy,Pa. B14 .....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 .....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5....122.50
Warren,O. C17.....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1 5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFranciscoB3 .....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H. S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ....5.30
Atlanta A11 .....5.50
Bessemer, Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1...6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1...8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y-1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3...6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10...5.55
Ashland l.c.l. (15) A10..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa. (9) J5...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 .....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11 .6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ....5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5...5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 .....5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 .....8.30
S.SanFrancisco B3 .....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. (9) B2..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ...5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (Including loaded extra) Carbon
LosAngeles P2, S30....11.75*

Alloy
Ambridge,Pa. W18....10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12, R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles (49) S30....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4...7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 .6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32...9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025

Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport, Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(staybolt)B14 .19.80
McK,Rks.(S.R.) L5 ....14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ...5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 ....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ...6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ...7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 .....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapmann&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1..5.10
Johnstown, Pa. (25) B2 ..5.10
Lackaw'na, N.Y. (25) B2.5.10
LosAngeles (25) B3 .....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 ....5.10
S. SanFrancisco (25) B3..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W. Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
KansasCity, Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 ....8.40
S. Chicago, Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 ....7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1 7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 ....7.575
S. SanFrancisco (25) B3 .8.325
SparrowsPoint, Md. B2 .7.575
Warren, O. R2 .....7.575
Weirton, W. Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn, Mich. S3 ....7.425
Detroit D2, M1, P20 .7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 ....7.525
Farrell, Pa. S3 .....7.425
Follansbee, W. Va. W10 .7.425
Fontana, Calif. K1 .....9.20
FranklinPark, Ill. T6 ..7.525
Ind. Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport, Pa. E10 ..7.525
NewBedford, Mass. R10..7.875
NewBritain, Conn. S15..7.875
NewCastle, Pa. B4, E5..7.425
NewHaven, Conn. D2 ...7.875
NewKensington, Pa. A6.7.425
Pawtucket, R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale, Ill. A1 .....7.525
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ..8.875
Warren, O. R2, T5 ....7.425
Worcester, Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie, Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
FranklinPark, Ill. T6 ..15.55
Harrison, N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. N8 ....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W. Va. W6 .....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	8.95	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	0.80C	1.05C	1.35C
Bristol, Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria, O. S1	19.05	22.15	....
FranklinPark, Ill. T6	19.20	23.30	28.15
Harrison, N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer, Mass. W12	18.85	....	....
Trenton, N.J. R5	18.85	22.95	27.80
Worcester, Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 ....7.525*
McKeesport, Pa. E10 ..7.50*
Riverdale, Ill. A1 .....7.525*
Warren, O. B9, S3, T5..7.425*
Worcester, Mass. A7 ...7.975
Youngstown S41, Y1..7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.60
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Ind. Harb. Y1	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
GraniteCity, G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
SparrowsPoint, Md. B2	8.20
Weirton, W. Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½¢ lower)	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom, W. Va. W10	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift, Pa. U5	8.10
Mansfield, O. E6	8.10
Warren, O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½¢ lower)	T-72	T-65	T-58	T-52
BeechBottom, W. Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

	Grain Oriented				
C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed, †Fully processed only. ‡Coils, annealed; semiprocessed ½¢ lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala R2 ..8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ....8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 ....8.25
Kokomo, Ind. C16 .....8.15
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16..8.00
Palmer, Mass. W12 ....8.30
Pittsburg, Calif. C11 ...8.95
Portsmouth, O. P12 ....8.00
Rankin, Pa. A7 .....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ...8.95
SparrowsPoint Md. B2 ..8.10
Sterling, Ill. (1) N15 ...8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ...8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. B2 ....13.40
KansasCity, Mo. S5 ...12.90
Minnequa, Colo. C10 ..12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ...12.95
Palmer, Mass. W12 ....13.70
Pittsburg, Calif. C11 ...13.45
Portsmouth, O. P12 ....12.65
Roebling, N.J. R5 .....12.95
SparrowsPt., Md. B2 ...13.50
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3.10.00
Kokomo, Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 .9.75
NewHaven, Conn. A7 ..10.05
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ..10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury, Mass. (12) N6..10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8.16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ..16.65
Johnstown, Pa. B2 .....16.30
KansasCity, Mo. S5 ....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C16 ....16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. I-7 .....16.50
Palmer, Mass. W12 .....16.60
S. SanFrancisco C10 ....17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6.16.60

WIRE, Tire Bead

Bartonville, Ill. K4 ....17.15
Monessen, Pa. P16 .....17.15
Roebling, N.J. R5 .....17.65

ROPE WIRE	(A)
Bartonville, Ill. K4	13.45
Buffalo W12	13.45
Fostoria, O. S1	13.45
KansasCity, Mo. U3	13.70
Johnstown, Pa. B2	13.45
Monessen, Pa. P7	13.45
Muncie, Ind. I-7	13.65
Palmer, Mass. W12	13.75
Portsmouth, O. P12	13.45
Roebling, N.J. R5	13.75
St. Louis L8	13.45
SparrowsPt., Md. B2	13.55
Struthers, O. Y1	13.45
Worcester, Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — **Col.**

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. — **Col**

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48)A11	9.10 9.775§
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam, 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

7/8 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Emeley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+24	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	35.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.580
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.340
18	4	2	....	...	T-2	2.065
13.5	4	3	....	...	T-3	2.195
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa. deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.53	8.66	10.06	....	10.94	9.33	11.80	16.38	9.92	9.15	10.50
Birmingham	9.43	10.20	10.46	....	10.41	9.09	13.14	16.76	9.00	9.29	10.90
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	8.74	10.20	10.95	53.00	10.40	8.84	10.65	15.95	9.33	8.67	10.46
Cincinnati	8.91	10.26	11.00	53.43	10.72	9.16	11.53	16.27	9.89	9.05	10.79
Cleveland	8.73	9.88	11.14	52.33	10.51	8.96	11.25	16.06	9.75	8.92	10.56
Dallas	9.47	10.30	12.59	....	11.03	8.88	12.98	16.95	9.11	9.20	10.87
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.12	9.93	12.19	52.00	10.68	8.53	13.10	16.55	8.76	8.85	10.52
Indianapolis	9.18	10.64	11.39	....	10.84	9.28	11.09	16.39	9.77	9.11	10.90
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.95	11.55	12.20	57.60	11.55	9.75	14.20	17.35	10.00	10.00	11.85
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
New York	9.36	10.13	11.35	53.08	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	9.10	10.00	10.89	52.17	11.10	9.50	11.95	16.38	9.85	9.55	10.55
Pittsburgh	8.73	9.88	11.03	52.33	10.49	8.85	11.25	15.95	9.36	8.68	10.32
St. Louis	8.54	10.58	11.33	....	10.50	8.95	11.28	16.33	9.45	8.78	10.57
St. Paul	9.00	9.59	10.74	....	10.66	9.12	11.49	16.54	9.63	8.95	10.49
San Francisco	10.90	11.85	11.45	55.10	12.15	10.65	15.10	17.25	10.85	10.90	12.90
Seattle	10.07	11.44	12.05	56.52	11.84	9.96	16.20	17.80	10.59	10.17	12.46
Spokane, Wash.	9.97	11.34	11.95	57.38	11.74	9.86	16.20	17.80	10.49	10.07	12.36

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. x 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, ⅝ in.—2⅞ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, ¼ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrail, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Haya, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo. $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70Per Cent: St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gidsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:
Carbon, Forging Quality (net ton) $97.00
Alloy (net ton) ... 115.00

Wire Rods:
Carbon, $\frac{1}{32}$" to under ¼ in. 5.30
Carbon, ¼ in. to 47/64 in. 5.70
Alloy 6.40
Wire (carload lots) .. 8.40

Bars & Small Shapes:
Carbon, merchant quality 5.40
Carbon, special quality 5.85
Alloy 6.40

Bar Mill Bands:
Carbon 5.40
Alloy 8.05

Structural Size Angles & Zees 5.40

Plates:
Carbon 5.45

Sheets & Coils, Hot Rolled:
Carbon Sheets 5.00
Carbon Strip 5.00

Sheets & Coils, Cold Rolled:
Carbon Sheets 6.35
Carbon Strip (0.080 and lighter) 6.35
Carbon Strip (0.081 and heavier) 6.65

Sheets & Coils, Galvanized:
Standard Quality .. 6.70
Culvert Quality ... 7.00

Sheets, Porcelain Enameling 7.45

Sheets & Coils, Electrical:
Field Grade 9.00
Armature Grade .. 9.50
Electrical Grade .. 10.15

Tin Mill Products (Per Base Box; 100 lb base wt)
Coke Tin Plate (1.25 lb pot yield) $10.60
Electrolytic Tin Plate (0.25 lb coating). 9.10
Black Plate 8.30

Nails, c.l. lots, (per keg) **400 keg min.** $8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails ...	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe..36.75, ton, del. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ..	58.0
Carbonyl Iron:	
98.1-98.9%, 2 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500-lb drum freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	35.10-52.20†
Bronze, 500-lb lots	53.10-56.70†
Copper, electrolytic ..	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	60.70-69.00†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-64.50
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304 ...	89.00
Stainless Steel, 316 ...	$1.07
Tin	14.00*
Zinc, 5000-lb lots	21.20-34.40‡
Tungsten:	Dollars
Carbon reduced, 98.8% min., minus 65 mesh	nom.**
Chromium electrolytic 99.8% Cr, min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$5.75*	*$5.65*	*$5.65*	*$5.50*	*$5.85*
Bar Size Angles	*5.85*	*5.75*	*5.75*	*5.60*	*5.95*
Structural Angles	*5.65*	*5.55*	*5.55*	*5.40*	*5.75*
I-Beams	*5.60*	*5.50*	*5.50*	*5.35*	*5.70*
Channels	*5.60*	*5.50*	*5.50*	*5.35*	*5.70*
Plates (basic bessemer)	*6.00*	*5.90*	*5.90*	*5.75*	*6.10*
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in. ...	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide ..	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	*6.25*	*6.15*	*6.15*	*6.00*	*6.35*
Merchant Bars	*5.85*	*5.75*	*5.75*	*5.60*	*5.95*
Hot-Rolled Bands	*6.20*	*6.10*	*6.10*	*5.95*	*6.30*
Wire Rods, Thomas Commercial No. 5	*6.40*	*6.40*	*6.30*	*6.25*	*6.60*
Wire Rods, O. H., No. 5	*6.75*	*6.75*	*6.65*	*6.60*	*6.95*
Bright Common Wire Nails (§)	*8.50*	*7.40*	*7.40*	*7.25*	*7.65*

†Per 82 lb net reel. §Per 100-lb keg. 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, Concentrates ..... nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian, 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo contents, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton. Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton. f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr; 0.010% max, 32.50c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42.45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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Exports Lend Support to Scrap

Foreign shipments buoy prices, notably in East, in face of inactive domestic mill demand and shrinking ingot operations. STEEL's index is unchanged at $33.33

Scrap Prices, Page 156

• **Pittsburgh**—The market tone is bearish. Steelmaking operations have steadied at 75 per cent of capacity, but scrap dealers expect further cutbacks. Trade sources report a major consumer is trying to back out of a buying commitment—presumably because steel operations are trailing off faster than expected.

• **Chicago**—Steelmaking operations are still declining here, but scrap prices appear to be holding steady on most of the steelmaking grades after a $1 to $2 a ton drop a week ago. Some cast iron grades declined last week, and the bottom may not have been reached.

• **Philadelphia** — Prices are unchanged; the market is supported by heavy export demand. It's estimated that about 80 to 85 per cent of all open hearth scrap accumulated by dealers in the immediate area is destined for foreign shipment.

• **New York** — Export business is booming and is expected to hold at high level through June. Foreign demand is keeping brokers' buying prices steady in the face of dull domestic buying.

• **Buffalo**—A small tonnage of No. 2 bundles was purchased by a local mill at $23, down $1 a ton from the last previous sale. Short shoveling turnings have been sold in modest tonnage at $20, off $2 a ton. On the basis of the recent mill purchases, all grades are down $1 to $2 a ton. The weakness in turnings is especially sharp. Cast scrap is also easier, with No. 1 cupola selling at $43, off $1 a ton.

• **Cleveland**—With steelmaking operations expected to decline over coming weeks, there's not much activity in scrap. The ingot rate rose 3 points to 77 per cent of capacity here last week, but it fell 2 points to 52 per cent in Youngstown. Despite the slow demand, the market tone is a little firmer; current prices on the steelmaking grades were confirmed by the purchase of a large tonnage of No. 1 heavy melting at $36 by a major Valley District steel producer.

• **Cincinnati**—The market is weak, and some prices have declined. Borings and turnings are off $1 a ton. Limited first-of-the-month mill orders are being filled easily. The outlook for coming weeks is not promising, especially with mill operations tending downward.

• **St. Louis**—Prices are unchanged. With steelmaking operations tend-

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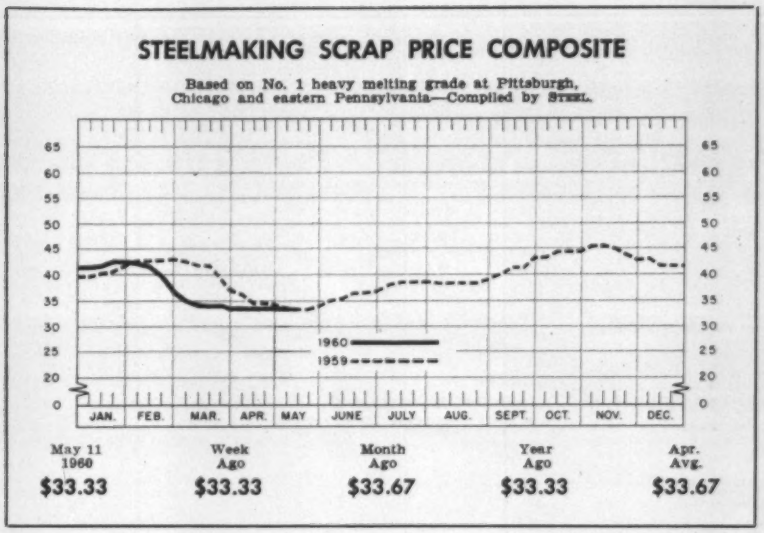


ing downward, mills are doing virtually no buying.

• **Birmingham** — Scrap is moving slowly in this district. Sales are limited to a few carloads at a time, except for purchases by cast iron pipe manufacturers. An electric furnace plant purchased limited tonnage at $1 a ton under the last price it paid.

• **Houston**—The Lone Star (Tex.) mill negotiated a limited scrap purchase for May delivery, maintaining its April price schedule. The Houston mill still has not purchased any scrap for May delivery (it was erroneously reported in the May 2 issue it had made a limited buy for May shipment). A mill spokesman says any new purchases will be strictly token tonnages.

• **San Francisco**—The local market continues in the doldrums. Still there's no pressure in the market for lower prices.

• **Seattle** — Prices are unchanged, but the market outlook is bearish. Sales are limited, and not much material is coming to dealers' yards from interior collecting points.

Pig Iron . . .

Pig Iron Prices, Page 150

Declining demand for pig iron has been due to the same factors that have hurt demand for steel: "Customers are not building up inventories to the extent that had been previously indicated. We are carrying pig iron inventories that ordinarily would be held by our customers," explains R. W. Thompson, president, Interlake Iron Corp., Cleveland.

Blast furnace operations are being curtailed to prevent a heavy accumulation of stocks of merchant iron and to bring output of hot metal in line with needs of steelmaking furnaces. The Lackawanna, N. Y., plant of Bethlehem Steel Co. has shut down another blast furnace, the second since the recent decline in mill operations began.

Import Pressure Down In Steel Markets

The market pattern in the Southwest is influenced by overbuying of foreign steel products on the mill level. In Texas, Belgium is the leading exporting country. Belgian mills shipped 60,000 tons into the state in March. Japan, with 8300 tons, was the second largest source of imports in Texas.

Foreign mill prices are unchanged to slightly higher. A French mill circulated a new price list in Houston which showed an upward adjustment of some base prices. Example: Rounds and squares, previously quoted at $5.79 base, are now offered at $5.79 for rounds and $5.84 for squares. The old base price for angles was $5.51, but the new price sheet shows 2 in. and larger angles still at $5.51, while 2 in. and smaller are $5.56. Some base prices for flat bars were also raised.

There are signs of a falling off in steel imports on the West Coast. Many users do not wish to become committed far ahead when domestic supplies, at the mill and warehouse levels, are plentiful and readily available. Another point: The price differential between foreign and domestic steel isn't as great as it was.

One San Francisco importer says he booked only 600 tons of Japanese steel in March, against 6000 tons in the like month last year. Another dealer says his orders for imported nails are close to 80 per cent of where they were in late 1959.

Prices on imported steel from Western Europe have undergone further declines, reflecting the continued lag in demand in this country. Sheet prices are unchanged, but they are purely nominal in the absence of buying. Delivery promises on imports fall in late June and early July. (For the latest prices, see Page 151.)

Plates . . .

Plate Prices, Page 145

While plate specialties are moving fairly well, deliveries running six to eight weeks, sheared plates are moving slowly. Tonnage shipments are available in two to four weeks.

There is little pickup in demand noted in any consuming area. One leading producer, however, thinks that the bottom will be reached within the next few weeks, rather than this sumer as had generally been predicted. He believes too many consumers are coasting too much on inventories to permit a continuance of the decline much longer.

Shops fabricating small tanks are disappointed with current order volume. Several have stocks of finished tanks still unsold. However, demand for heavy plates is reported up slightly in the Midwest. "No one is breaking down our doors to get tonnage," observes one mill executive, "but ordering is better than it has been."

Structural Shapes . . .

Structural Shape Prices, Page 145

Fabricators are disappointed by the volume of new structural business coming out. There's a mod-

(*Please turn to Page* 161)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, May 11, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

May 11	$33.33
May 4	33.33
Apr. Avg.	33.67
May 1959	33.58
May 1955	34.87

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 dealer bundles	34.00-35.00
No. 2 bundles	25.00-26.00
No. 1 busheling	33.00-34.00
No. 1 factory bundles	39.00-40.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut structurals:	
2 ft and under	41.00-42.00
3 ft and under	40.00-41.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	44.00-45.00
Electric furnace bundles	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	44.00-45.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Random rails	51.00-52.00
Angles, splice bars	45.00-46.00
Railroad specialties	47.00-48.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	*200.00-205.00†*
18-8 turnings	*100.00-105.00†*
430 bundles & solids	*100.00-105.00†*
430 turnings	*50.00-55.00†*

CHICAGO

No. 1 hvy melt., indus.	32.00-33.00
No. 1 hvy melt., dealer	30.00-31.00
No. 2 hvy melting	27.00-28.00
No. 1 factory bundles	36.00-37.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	20.00-21.00
No. 1 busheling, indus.	32.00-33.00
No. 1 busheling, dealer	30.00-31.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	37.00-38.00
Punchings & plate scrap	38.00-39.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	37.00-38.00
Unstripped motor blocks	*35.00-36.00*
Clean auto cast	*49.00-50.00*
Drop broken machinery	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
R.R. malleable	48.00-49.00
Rails, 2 ft and under	*50.00-51.00*
Rails, 18 in. and under	*51.00-52.00*
Angles, splice bars	43.00-44.00
Axles	51.00-52.00
Rails, rerolling	52.00-53.00

Stainless Steel Scrap

18-8 bundles, solids	195.00-200.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	15.00-16.00
No. 1 bundles	29.00-30.00
No. 2 bundles	13.50-14.50
No. 1 busheling	26.00-27.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	9.00-10.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	32.00-33.00
Heavy breakable	32.00-33.00
Unstripped motor blocks	24.00-25.00
Charging box cast	32.00-33.00
Clean auto cast	45.00-46.00

CLEVELAND

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	23.00-24.00
No. 1 factory bundles	36.00-37.00
No. 1 bundles	32.00-33.00
No. 2 bundles	19.00-20.00
No. 1 busheling	32.00-33.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	35.00-36.00
Cut structurals, plate 2 ft and under	43.00-44.00
Low phos. punchings & plate	34.00-35.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Charging box cast	33.00-34.00
Heavy breakable cast	35.00-36.00
Stove plate	44.00-45.00
Unstripped motor blocks	35.00-36.00
Brake shoes	35.00-36.00
Clean auto cast	52.00-53.00
Burnt cast	42.00-43.00
Drop broken machinery	54.00-55.00

Railroad Scrap

R.R. malleable	49.00-50.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	49.00-50.00
Cast steel	42.00-43.00
No. 1 railroad cast	52.00-53.00
Railroad specialties	45.00-46.00
Angles, splice bars	45.00-46.00
Rails, rerolling	60.00-61.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	195.00-200.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	100.00-105.00
430 turnings	30.00-40.00

YOUNGSTOWN

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	26.00-27.00
No. 1 busheling	35.00-36.00
No. 1 bundles	35.00-36.00
No. 2 bundles	22.00-23.00
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	37.00-38.00
Electric furnace bundles	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.50-36.50

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	30.00-31.00
No. 2 bundles	*22.00-23.00*
No. 1 busheling	30.00-31.00
Shovel turnings	*19.00-20.00*
Machine shop turnings	*14.00-15.00*
Cast iron borings	*17.00-18.00*
Low phos. structurals and plate, 2 ft and under	41.00-42.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*42.00-43.00*
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	50.00-51.00
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	29.50-30.50
No. 2 heavy melting	*24.50-25.50*
No. 1 bundles	29.50-30.50
No. 2 bundles	19.50-20.50
No. 1 busheling	29.50-30.50
Machine shop turnings	*12.00-13.00*
Mixed borings, turnings	*12.00-13.00*
Shovel turnings	*15.00-16.00*
Cast iron borings	*14.00-15.00*
Low phos. 18 in.	*38.00-39.00*

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Heavy breakable cast	35.00-36.00
Charging box cast	37.00-38.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	47.00-48.00

PHILADELPHIA

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00
No. 1 bundles	37.00
No. 2 bundles	22.00
No. 1 busheling	37.00
Electric furnace bundles	38.00
Mixed borings, turnings	19.00†
Shovel turnings	23.00†
Machine shop turnings	19.00†
Heavy turnings	29.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	44.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	43.00
Drop broken machinery	51.00-52.00
Malleable	55.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	180.00-185.00
18-8 borings, turnings	90.00-95.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	26.00-27.00
No. 1 busheling	26.00-27.00
Machine shop turnings	6.00-7.00
Shovel turnings	11.00-12.00
No. 1 cast	39.00-40.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
No. 1 busheling	35.00-36.00
Cast iron borings	12.00-13.00
Machine shop turnings	21.00-22.00
Shovel turnings	22.00-23.00
Bar crops and plate	40.00-41.00
Structurals & plate	39.00-40.00
Electric furnace bundles	35.00-36.00
Electric furnace: 3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	50.00-51.00
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	43.00-44.00
Angles, splice bars	42.00-43.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00
No. 2 heavy melting	28.00
No. 1 bundles	33.00
No. 2 bundles	19.00
No. 1 busheling	33.00
Machine shop turnings	13.00
Shovel turnings	15.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	35.00†
Clean auto cast	47.00
Stove plate	39.00†

Railroad Scrap

No. 1 R.R. heavy melt.	34.00
Rails, random lengths	41.00
Rails, rerolling	54.00
Rails, 18 in. and under	46.00†
Angles, splice bars	43.00†

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 2 bundles	19.00
Machine shop turnings	13.00-13.50
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	27.00†
Foundry malleable	31.00†
Unstripped motor blocks	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†

LOS ANGELES

No. 1 heavy melting	33.00
No. 2 heavy melting	30.00
No. 1 bundles	33.00
No. 2 bundles	17.00
Machine shop turnings	16.00
Shovel turnings	16.00
Cast iron borings	16.00
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades

No. 1 cupola	40.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 1 bundles	29.00
No. 2 bundles	19.00
Shovel turnings	16.00
Electric furnace bundles	43.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable	26.00
Unstripped motor blocks	24.00
Stove plate	21.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	32.00
No. 2 heavy melting	28.00
No. 1 bundles	28.00
No. 2 bundles	19.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Electric furnace No. 1	42.00

Cast Iron Grades

No. 1 cupola	30.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

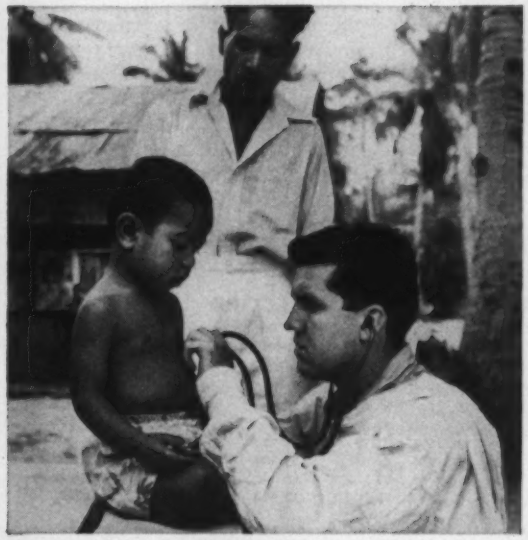
†Nominal.
‡F.o.b. Hamilton, Ont.

OFFICIAL UNITED STATES NAVY PHOTOGRAPH

This great seaborne health center will carry a new kind of aid abroad—*with your help*. Part of the people-to-people project Hope, it will enlist 200 specialists in sharing our health skills.

Ambassador with a blackboard, the Hope specialist will help the often woefully few local medical technicians train helpers. The result: many more hands. And that means one Hope dollar is multiplied many times over.

YOUR HELP CAN COME BACK A HUNDRED TIMES OVER



One local doctor for 100,000 people. These are the odds Hope may face. Yet Hope can mean so much. The health of this child. The health of five Indonesians. *Trained* hands and only a dollar's worth of penicillin can cure them of crippling yaws.

If enough of us help, the S.S. Hope will be outbound in 1960. First port of call: Indonesia. A bold health project called Hope will be underway.

The need is crucial. Many places, too many health hazards exist. Too many people robbed of the will to live. Too few hands to help. Often, a doctor for 100,000.

Hope's approach is *practical*. Help where a nation's doctors ask help. Help them help themselves to health. By training, upgrade skills—multiply hands. Hope's doctors, dentists, nurses, and technicians will man a center complete to 300-bed mobile unit and portable TV.

You can not only make every dollar do the work of many, you can earn a priceless dividend. With health comes self-respect. People at peace with themselves are less likely to war with others.

Hope is *yours* to give. It's a people-to-people project. For one year's worth, 3½ million Americans must give a dollar. Don't wait to be asked. Mail a dollar or more now to HOPE, Box 9808, Washington 15, D.C.

ADVERTISING COUNCIL PUBLIC SERVICE

HELP LAUNCH HOPE

Lots of Smoke; No Fire

Congress will probably take that attitude when the question of new legislation to help metals industries comes up. But it may urge federal agencies to watch certain activities

Nonferrous Metal Prices, Pages 160 & 161

METALMEN looking to Congress for any sweeping measures to cure industry problems are probably going to be disappointed. Insiders don't see much chance for major legislation in this session.

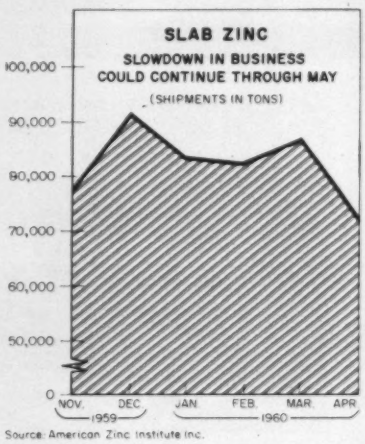
• **No Aluminum Bills**—Take Subcommittee No. 3 of the House Select Small Business Committee (better known as the Yates Committee) for example. It took voluminous testimony this month from a parade of witnesses from trade associations and independent aluminum fabricators. The witnesses criticized hot metal contracts, scrap exports, mergers and acquisitions, pricing policies, and other activities of the primary producers.

Yet none of the congressmen got too excited—probably because much of the testimony sounded like a familiar tune. And some legislators made no secret that they were miffed because witnesses had no specific proposals to offer.

It seems certain that when the committee issues its report it will not ask for additional legislation. More likely is a recommendation that any problems be handled under the present authority of federal agencies.

One Democratic committee member says that he believes several conditions in the industry require action. He favors strong recommendations advising federal agencies to keep a closer eye on aluminum. A Republican committeeman points out that the transcript of the proceedings is being scrutinized by the Justice Department.

• **Lead-Zinc** — Any broad scaled legislation to eliminate the controversial system of quotas (which limit exports of lead and zinc) and substitute higher tariffs will probably have to wait until a new administration takes over. Several bills have been presented in both the House and Senate, but observers are doubtful if they will even get to the floor.



Source: American Zinc Institute Inc.

Better chance of passage is given a bill which would subsidize small miners to the tune of 2000 tons of lead and zinc annually. Some people feel the bill, which has the blessing of the House Interior Committee, could squeak through because of its relatively low cost ($4.8 million a year) and the chance it might get the administration's blessing. But odds are still 50-50 that it won't pass this time.

In the Markets

• **Lead Perks Up**—Lead producers are riding the crest of the feast-famine cycle that's characteristic of the market. April sales were the best since January. Demand is holding up well this month, being given a slight impetus by the strike which has shut down the Bunker Hill Co.'s mining and processing properties. May sales will probably top April's by a small margin. The price is strong but shouldn't move any time soon.

• **Zinc Slow** — Zinc sales have slumped following a good level of activity in the latter part of 1959 and in the first quarter of this year. Shipments of slab zinc in April dropped to 71,926 tons (see chart) for the poorest month since last October. Since production stayed at a high level, producers' stocks took their first jump upward since August and now stand at 147,861 tons.

Producers attribute poorer sales to the inventories built up by customers: 1. In anticipation of a business upswing. 2. To beat the price hike in zinc diecasting alloys which went into effect Apr. 1.

• **Magnesium on Plateau** — The slowdown in the military aircraft program and the present lack of a large tonnage civilian market are the main reasons for magnesium's present slowness. Wrought product shipments, for example, are on a plateau, hitting 2613 tons in the first quarter, 2608 tons in the fourth quarter of 1959, and 2589 tons in 1959's first quarter. Shipments of castings haven't done so well.

NONFERROUS PRICE RECORD

	May 11 Price	Last Change	Previous Price	Apr. Avg	Mar. Avg	May, 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	24.700
Copper	33.00	Mar. 10, 1960	33.00–35.00	33.000	33.296	31.750
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	11.700
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	99.25	May 11, 1960	99.125	99.260	100.227	103.080
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	11.000

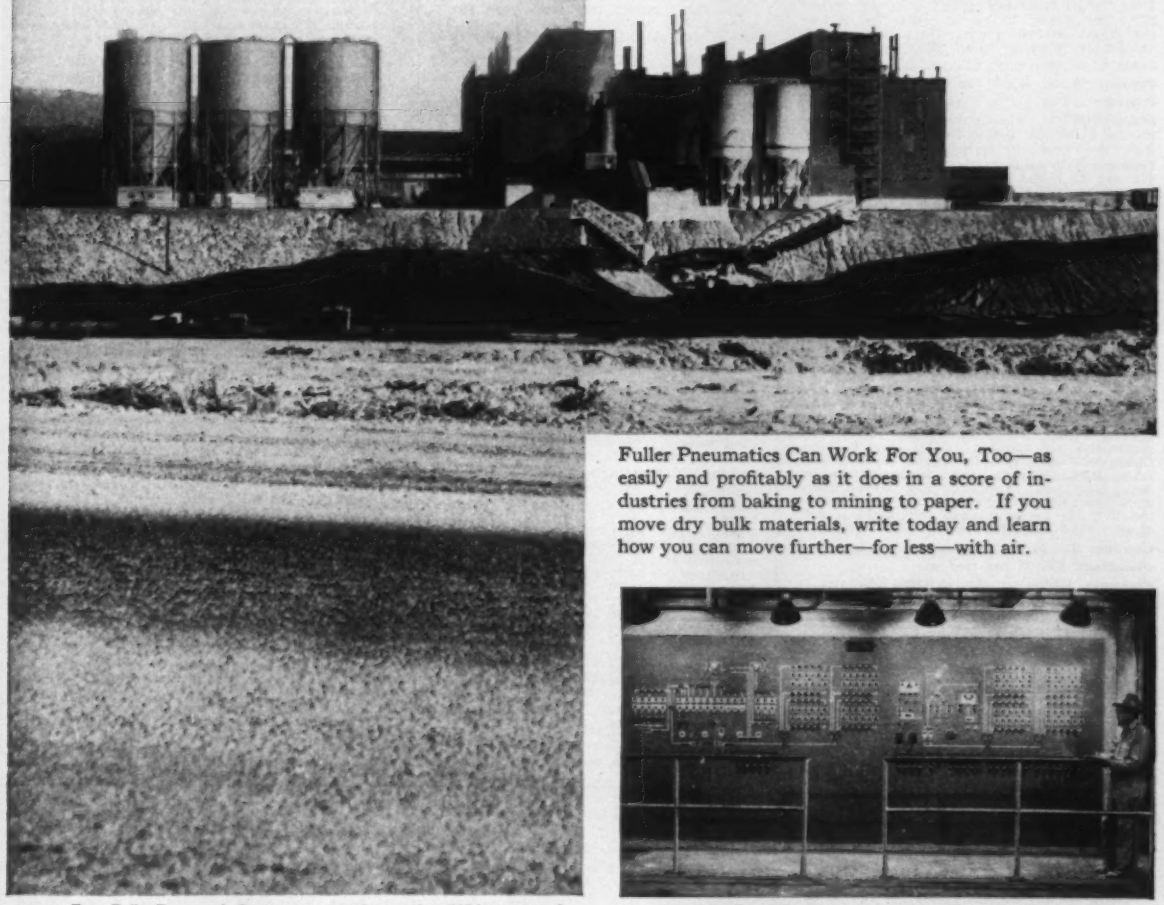
Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

How Pneumatic Conveying Helps Make New Mining Process Economically Practical

Taconite processing is typical of the many varied, cost-saving applications for Fuller Pneumatic Conveying.

They're turning low assay iron ore into rich pellets on the Mesabi these days. Moving additives for pelletizing, Fuller plays a special role in this feat of engineering and production economy.

Fuller Pneumatic Conveying Systems are carrying fine anthracite screenings, soda ash, and bentonite from siding to storage to processing—with speed, safety, sanitation, and efficiency. With few moving parts to wear out and powered by inexpensive low-pressure air, Fuller Pneumatic Conveying Systems speed dry bulk materials *anywhere that a pipeline can be run:* under ground, up through floors, around corners . . . for far greater distances and at substantially lower cost than possible with mechanical conveyors.



Four Fuller Pneumatic Systems can speed more than 307 long *tons* of additives through this huge Taconite Pelletizing Plant in a single day.

Fuller Pneumatics Can Work For You, Too—as easily and profitably as it does in a score of industries from baking to mining to paper. If you move dry bulk materials, write today and learn how you can move further—for less—with air.

Centralized control is provided by giant panel designed and manufactured by Fuller.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY
160 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller
. . . . pioneers in harnessing AIR

2097
G229

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $213-215 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 99.25.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.50; special high grade, 14.75 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 25.50-26.50; 13 alloy, 0.60 Cu max., 25.50-25.75; 195 alloy, 27.75-28.75; 108 alloy, 25.25-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft lengths

Screw Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 20.75-21.25; light copper, 18.75-19.25; No. 1 composition red brass, 17.25-17.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a			SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Rod Heavy	Clean Rod Ends	Clean Turnings
Copper	50.00b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.75-16.25; new brass clippings, 14.50-15.00; light brass, 11.00-11.50; heavy yellow brass, 12.00-12.50; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 13.00-13.50; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 27.00-28.00; old sheets, 23.00-24.00; turnings, 20.00-22.00; rods, 27.00-28.00.

Nickel: Sheets and clips, 53.00-54.00; rolled anodes, 53.00-54.00; turnings, 41.00-42.00; rod ends, 53.00-54.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 7.25-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 12.50-13.00; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 14.00-14.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.25-11.75; clean borings and turnings, 10.00-10.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.50; light copper, 22.00; refinery brass (60% copper) dry copper content, 22.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.50; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.25; yellow brass turnings, 14.00; radiators, 16.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (Anhydrous): 25 lb, 153.20; 100 lb, 148.30; 400 lb, 145.90; 800-19,900 lb, 105.00; 20,000 lb or more, 98.90.

Stannous Sulphate: Less than 50 lb, 138.40; 50 lb, 108.40; 100-1900 lb, 106.40; 2000 lb or more, 104.40.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 155*)

erate amount of contracting, but it's short of seasonal expectations. In fact, some shops have not been able to build up their backlogs to any extent and are competing sharply for available work.

Some fair sized projects are actively before the market in the East, but most of the work pending is small.

Except for bridge shops, bookings of fabricated structural steel are slow in New England. About 8500 tons are pending for highway structures in Connecticut and Vermont. Area shops are not buying steel against anticipated requirements.

In the Midwest, a slight pickup in demand for structurals is noted. Fabricators seem a little more optimistic about their order books for summer and fall construction.

"With the easing of the weather, there will be plenty of new construction," is the way Ned A. Ochiltree, board chairman, Ceco Steel Products Corp., Chicago, puts it. "Certainly our bookings in recent weeks have been increasing."

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

12,500 tons, Consolidated powerplant, Ravenswood, Queens, New York, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

7000 tons, New York Telephone Exchange Bldg., Tenth Ave., New York, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

1600 tons, for three buildings at the Polaris missile base at Point Mugu, Calif., to the P. I. Steel Corp., a subsidiary of Stanray Corp., Chicago.

1390 tons, student-faculty building, Stevens Institute of Technology, Hoboken, N. J., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

700 tons, hangar and miscellaneous construction, Tydio Air Base, Fla., through F. D. Rich Co., Stamford, Conn., to Calvert Iron Works, Atlanta.

660 tons, building, Norfolk, Va., through Paul Tishman, New York, to Globe Iron Works, Norfolk, Va.

430 tons, wide flange, Navy, General Stores Supply Office, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; 95 tons, stainless bars, to Caine Steel Co., Chicago.

250 tons, building, Hussman Refrigerator Co., Delaware Township, New Jersey, to Frank M. Weaver Co., Lansdale, Pa.

150 tons, for warehouse and other buildings, at Point Mugu, Calif., to P. I. Steel Corp. The structures will be erected by Diversified Builders Inc.

100 tons or more, intake gate hoists, Oahe Reservoir project, near Pierre, S. Dak., to Lakeside Bridge & Steel Co., Milwaukee, at $373,494.

STRUCTURAL STEEL PENDING

7350 tons, District of Columbia stadium, Washington; opening of bids postponed until June 1.

3000 tons, housing development, New York, Housing Authority, West Brighton, Staten Island, N. Y.; S. F. Silberblatt Inc., that city, low on the general contract.

2230 tons, 25-span bridge over Route 67, Seymour, Conn.; L. G. Defelice & Son Inc., North Haven, Conn., low on the general contract; also 1165 tons of reinforcing bars, 502 tons of steel piling, and 245 tons of mat reinforcement.

1635 tons, state highway work, Ottaswa and Kent counties, Michigan; Carl Goodwin, Detroit, general contractor.

1250 tons, state highway bridges and viaduct, Providence, R. I.; M. A. Gammino Construction Co., Providence, low on the general contract.

1045 tons, three, 3-span and two, 1-span composite wide flange beam bridges, Waterbury-Bolton, Vt., contract No. 1; Landers & Griffin Inc., Portsmouth, N. H., low on the general contract; also 230 tons, concrete reinforcing bars.

400 tons, section, Jones Falls Expressway, Baltimore; Kaufman Construction Co., Philadelphia, is low on the general contract.

295 tons, two, 3-span composite wide flange beam bridges, Waterbury-Bolton, Vt., contract No. 2; Lane Construction Co., Meriden, Conn., low on the general contract; also 210 tons, reinforcing bars, and 100 tons steel piling.

229 tons, four-span plate girder bridge, Farmington River, New Hartford-Canton, Conn.; White Oak Excavators Inc., Plainville, Conn.; low on the general contract; also 150 tons, reinforcing bars, and 85 tons of steel piling.

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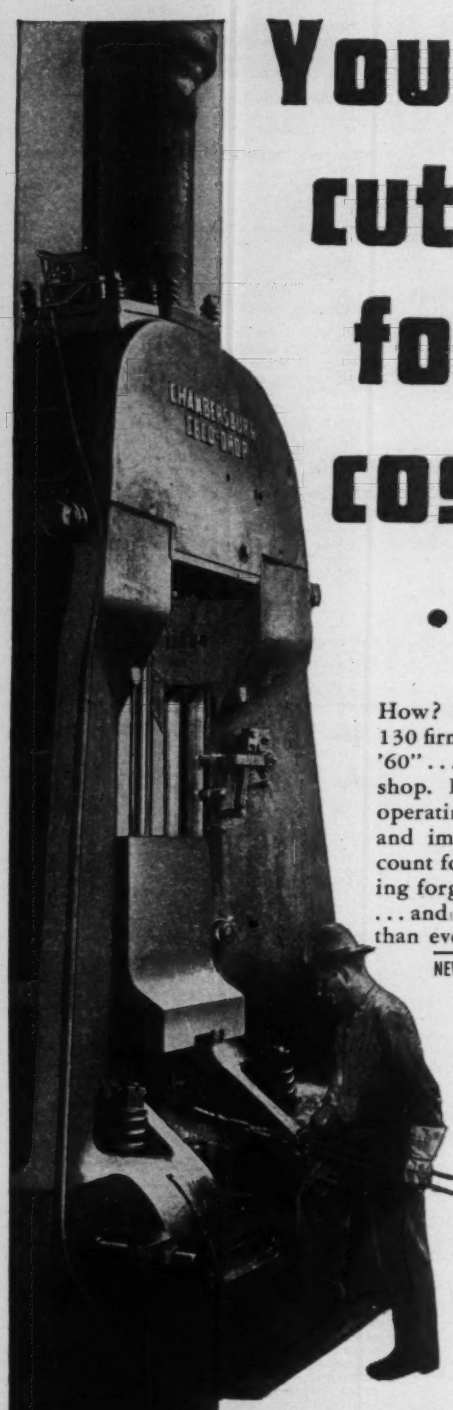
SALES ENGINEER—One of our progressive, expanding divisions has an excellent opening in the Chicago area for a man qualified to sell clamshell buckets and grapples. This division manufactures an extensive line of buckets and grapples for the steel industry, industrial and contracting business. Qualifications: Prefer M.E. degree with sales experience along these lines. Craneway, crawler, overhead and locomotive type crane experience will be given consideration. Compensation: Salary — plus expenses — plus fringe benefits to include insurance, pension, savings and vacation. Send complete qualifications and salary desired to Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh 22, Pa. J. J. Zimmerman.

Positions Wanted

PLANT MANAGER Drawn Aluminum Tubing 20 years experience all alloys and shapes. Handle maintenance, employee training including supervisory, shipping and payroll. Spent last 5 years at small shop specializing bright finish furniture and light wall curtain tubing. Box 851, STEEL, Penton Bldg., Cleveland 13, Ohio.



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How? By joining the more than 130 firms who are being "thrifty in '60" . . . install Ceco-Drops in your shop. Higher production, lower operating and maintenance cost, and improved safety features account for its endorsement by leading forge shops all over the world . . . and today's Ceco-Drop is better than ever!

NEW FEATURES ON TODAY'S CECO-DROPS

1. New Die-setting Ram Control, which makes die-setting easier and safer. Operator can raise or lower ram at will with no danger.
2. New Double Acting Non-slip Rod Clamp, which improves rod clamping. Faster action makes hammerman's job easier.
3. New Nylon-cushioned Stroke Control, which reduces shock to valve control rigging, and reduces wear on ram incline.

Write for 28-page bulletin, "The Ceco-Drop and its place in Forge Shop Modernization"

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CHAMBERSBURG

• The Hammer Builders •

DESIGNERS AND MANUFACTURERS OF THE IMPACTER

When it's a vital part, design it to be FORGED

160 tons, three span welded steel girder bridge, Hopkinton, N. H.; also 56 tons of reinforcing bars, and 46 tons of bearing piles.

110 tons, three span composite wide flange beam bridge, Lyndon, Vt.; also 60 tons of reinforcing bars.

Unstated, two steel frame structures, also government furnished material for steel antenna, Adak, Alaska, Navy installation; P.O.L. Contractors, Anchorage, Alaska, low at $1,987,000 to the Thirteenth Naval District.

REINFORCING BARS . . .

REINFORCING BARS PLACED

800 tons, first phase, Health Center, Harvard University, Cambridge, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., Boston, general contractor.

670 tons, addition to Securities Bldg., Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Brazier Construction Co., Seattle, general contractor.

117 tons, tunnel construction, Everett, Wash., water system project, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

REINFORCING BARS PENDING

183 tons, three schedules, Crooked River project, Oregon; bids to the Bureau of Reclamation, Prineville, Oreg., June 10.

75 tons, also miscellaneous, Lane County, Oreg., national forest bridge; bids to the U. S. Engineer, Portland, Oreg., June 1.

25 tons, also concrete girders and steel piling, Washington State girder bridge, Kittitas County; bids to Olympia, Wash., May 17.

Unstated, five story addition to physics-chemical building, Oregon State College, Corvallis; bids to the Board of Higher Education, Portland, Oreg., June 3.

PLATES . . .

PLATES PLACED

2228 tons, high tensile, grade HY-80, Navy Purchasing Office, Washington, to U. S. Steel Corp., Pittsburgh.

1617 tons, high tensile, grade HY-80, Navy Purchasing Office, Washington, to Lukens Steel Co., Coatesville, Pa.

750 tons, 110 in. outlet pipe, Navajo Dam, Colorado River storage project, Bureau of Reclamation, Denver, to Eaton Metal Products Co., Salt Lake City, Utah; Baldwin-Lima-Hamilton Corp., Philadelphia, awarded eight, 155,500 hp, vertical shaft hydraulic turbines for the Glen Canyon powerplant at $6,392,000.

585 tons, two tanks, Socony Mobil Oil Co., Newington, N. H., to Graver Tank & Mfg. Co., East Chicago, Ind.

PLATES PENDING

100 tons, water tank, Pittsburgh-Des Moines Steel Co., Seattle, low at $34,127 to Arlington, Wash.

PIPE . . .

CAST IRON PIPE PLACED

357 tons, 12 in., Seattle Water District, to Pacific States Cast Iron Pipe Co., Seattle.

316 tons, 6 to 12 in., for Edmonds, Wash., to U. S. Pipe & Foundry Co., Seattle.

286 tons, 6 to 12 in., Tacoma Water District, to Pacific States Cast Iron Pipe Co., Seattle.

198 tons, 8 and 10 in., for Wenatchee, Wash., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

343 tons, 8, 12, and 16 in.; bids to Alderwood Manor, Wash., May 9.

239 tons, 6 and 8 in.; bids in to Naval District No. 13, Seattle.

235 tons, 4 to 12 in., local district, Anchorage, Alaska; bids in May 9.

Advertising Index

Aetna-Standard Division, Blaw-Knox Co. ..... Inside Front Cover
Alan Wood Steel Co. 153
Allegheny Ludlum Steel Corporation 79
Allis-Chalmers 74
American Cast Iron Pipe Co. Special Products Division 164
American Chain & Cable Co., Inc., Page Steel & Wire Division 31
American Hoist & Derrick Co. 134
American Nickeloid Co. 11
American Pulverizer Co. 10
Amplex Division, Chrysler Corporation ..12, 13
Armstrong-Blum Mfg. Co. 45
Automotive Gear Division, Eaton Manufacturing Co. 69

Baird Machine Co., The 16
Baltimore & Ohio Railroad 139
Bayonne Bolt & Nut Corporation 86
Bethlehem Steel Co. 1
Blaw-Knox Co. 161
Blaw-Knox Co., Aetna-Standard Division ..... Inside Front Cover
Borg-Warner Corporation, Ingersoll Kalamazoo Division 154
Borg-Warner Industrial Cranes 116
Brook Motor Corporation 86
Butler Manufacturing Co. 48, 49

Chambersburg Engineering Co. 162
Chrysler Corporation, Amplex Division 12, 13
Clad-Rex Division of Simoniz Co. 2
Clymer Associates, Inc. 72
Colorado Fuel & Iron Corporation, The 28, 29
Columbia Tool Steel Co. 154
Cullen-Friestedt Co. 141

De Laval Steam Turbine Co. 32, 33
Dempster Brothers, Inc. 130
Duff-Norton Co. 89
Dykem Co., The 154

Eastern Stainless Steel 20, 21
Eaton Manufacturing Co., Automotive Gear Division 69
Eaton Manufacturing Co., Farval Division 50
Eaton Manufacturing Co., Reliance Division .. 24
Electric Equipment Co. 161

Farval Division, Eaton Manufacturing Co. .. 50
Federal Bearings Co., Inc., The 25
Federal Machine & Welder Co., The 92
Foote Bros. Gear & Machine Corporation 144
Fuller Co. 159

Garlock, Inc. 22, 23
Gas Atmospheres, Inc. 131
General Electric Co. 140
Gisholt Machine Co. 19

Harris Foundry & Machine Co. 132
Heresite & Chemical Co. 127
Hill Acme Co., The 30
Hitchener Manufacturing Co., Inc. 6

Ingersoll Kalamazoo Division, Borg-Warner Corporation 154
Inland Steel Co. 128, 129
International Nickel Co., Inc., The 46

Jones & Lamson Machine Co. 103, 105, 107, 109
Jones & Laughlin Steel Warehouse Division.. 17

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Refractories & Chemicals Division 26, 27

Leeds & Northrup Co. 18
Levinson Steel Co., The 15
Lukens Steel Co. 70

McLouth Steel Corporation 93

Machine Tool Exposition, The 87
Magor Car Corporation 137
Malleable Castings Council 36, 37
Marchant, Geo. F., Co. 122
Mesta Machine Co. 111
Midland-Ross Corporation, Surface Combustion Division 82, 83

National Machine Tool Builders Association .. 87

Ohio Crankshaft Co., The 35
Ohio Electric Mfg. Co., The 4

Pacific Industrial Manufacturing Co. 90, 91
Page Steel & Wire Division, American Chain & Cable Co., Inc. 31

Radio Corporation of America, Electronic Data Processing Division 80, 81
Ready-Power Co., The 123
Reliance Division, Eaton Manufacturing Co. .. 24
Republic Steel Corporation 8, 9
Robbins & Myers, Inc., Hoist & Crane Division 85
Rolled Alloys, Inc. 163
Rollway Bearing Co. 7
Royal McBee Corporation, Data Processing Division 60
Rust-Oleum Corporation 38, 39
Ryan Industries, Inc., Cryogenic Division 73
Ryerson, Joseph T., & Son, Inc. 40

Sandvik Steel, Inc. 119
Shenango Furnace Co., The, Centrifugally Cast Products Division 121
Simoniz Co., Clad-Rex Division 2
Square D Co. 113
Standard Screw Co. 14
Sun Shipbuilding & Dry Dock Co. 34
Surface Combustion, A Division of Midland-Ross Corporation 82, 83

Textron, Inc., The Waterbury Farrel Foundry & Machine Co. Division 59
Timken Roller Bearing Co., The .....Back Cover
Tomkins-Johnson Co., The 126

Udylite Corporation, The 88
United States Rubber Co., Mechanical Goods Division 66
Universal Cyclops Steel Corporation 77
Universal Grinding Corporation 122
Urick Foundry Co. 84

Wales Strippit, Inc. 138
Warner & Swasey 3
Waterbury Farrel Foundry & Machine Co., The, Division of Textron, Inc. 59
Wean Engineering Co., Inc., The ..... Inside Back Cover
Webb Corporation, The 136
Weinstein Co. 161
Wheelabrator Corporation 124, 125
Whiting Corporation 65
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 28, 29
Wyman-Gordon 94

~ ~ ~

Table of Contents
Facing Inside Front Cover

Classified Advertising, Page 161

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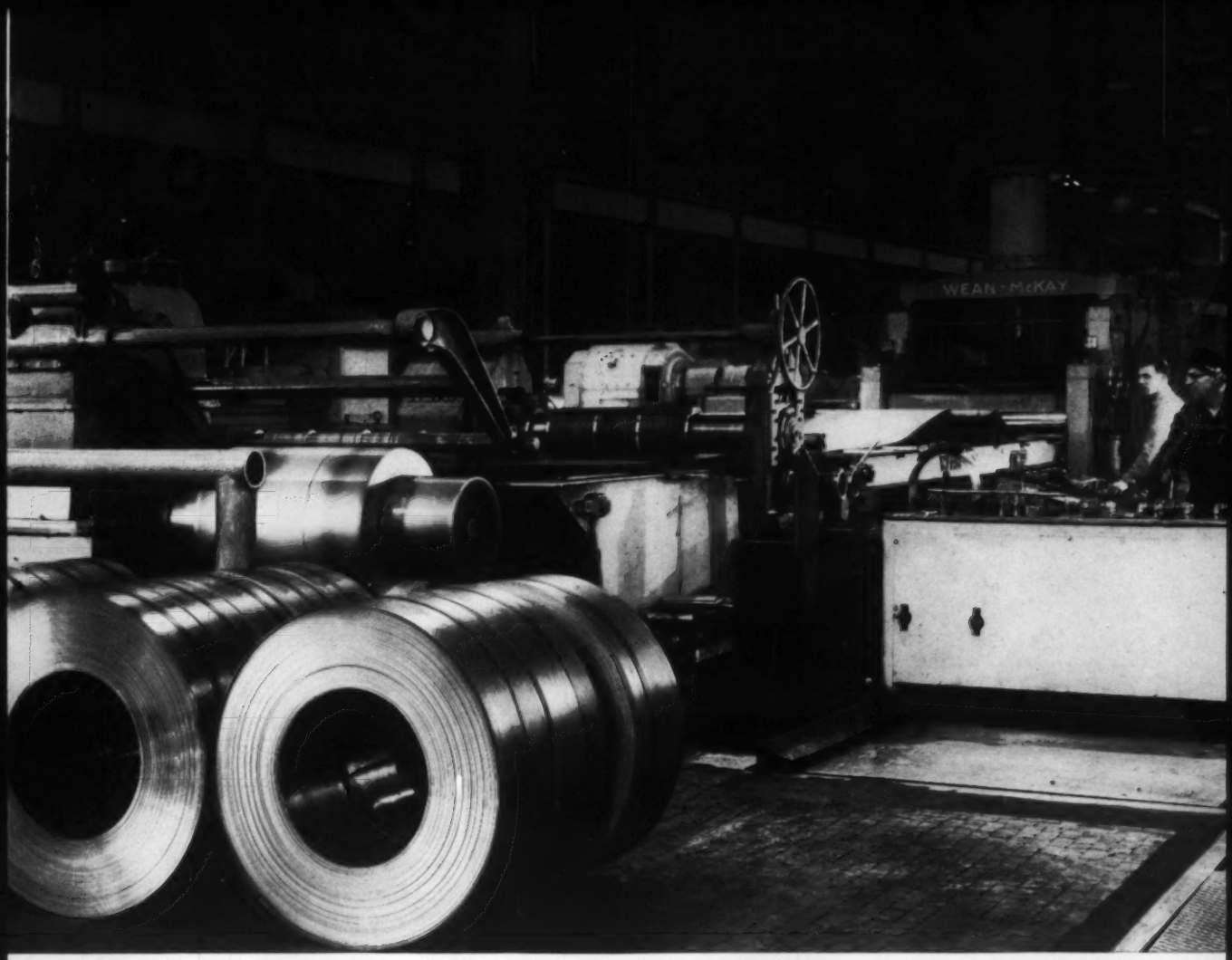


Pittsburgh Steel keeps production costs down with Wean Hot Rolled Strip Slitting Line

Pittsburgh Steel Company maintains a high production rate at its Allenport, Pennsylvania hot strip mill with this heavy duty Wean slitting line. The Wean line allows Pittsburgh Steel to follow the economical practice of rolling wide strip and then slitting it to a variety of customer-specified widths. It not only frees the hot strip mill of production runs with narrow strip, but also enables Pittsburgh to offer a wider range of strip widths.

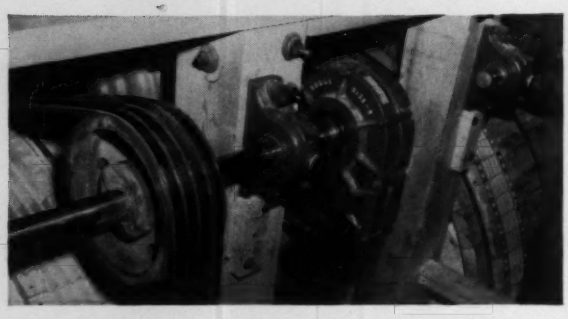
This line can handle coils up to 60″ O.D., recoiling the slit strands on either 20″ or 24″ expanding mandrels. Strip ranging from 18″ to 60″ in width and .049″ to .188″ in thickness can be side-trimmed and slit at speeds up to 300 fpm. A processing uncoiler "works" the strip to eliminate serious cross-breaks and flattens it to permit accurate slitting.

We would like to suggest that you put Wean's extensive experience to work on your next slitting line project. You will find that in slitting, as in all phases of sheet, strip and tin plate processing, Wean "creative engineering" leads the field in design and construction of modern processing line equipment.

WEAN

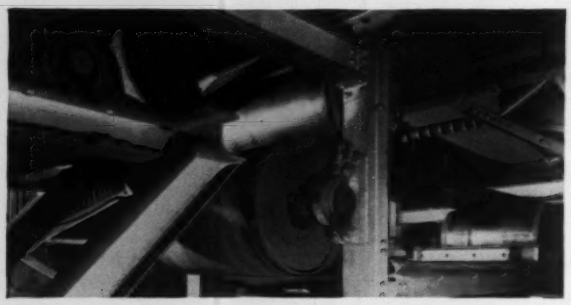
THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

How Dodge pillow blocks with Timken® bearings give longer life with less maintenance



1. Two 2 7/16" Dodge Special Duty pillow blocks equipped with Timken® tapered roller bearings, support the line shaft driving six by eight foot tanning drums. The tapered design of Timken bearings enables them to take both radial and thrust loads in any combination.

2. The crusher at a trap rock and asphalt plant runs faster, gives more production now that Dodge Double Interlock pillow blocks on Timken bearings are installed. The Timken bearings in these blocks give full-line contact between rollers and races for greater load carrying capacity.



3. The Timken bearings in All-Steel Dodge pillow blocks must stand up under adverse operating conditions found when sintering metals. One major advantage of Timken tapered roller bearings is their ability to hold housings and shafts concentric, thus keeping lubricant in, dirt and dust out.

The photo at right shows the Dodge All-Steel pillow block Timken bearing equipped. The specially designed bearing has a tapered bore with self-aligning spherical outer surface—never needs adjustment.

There's a Dodge pillow block equipped with Timken bearings to fill every engineering need: All-Steel, Type "E", Double-Interlock, Type "C" and Special Duty. And with Timken bearings, space consuming thrust devices are not needed. Look for Timken bearings in all the machines you buy or build. They're the symbol of quality. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.

BETTER-NESS rolls on

TIMKEN®

tapered roller bearings